THE SCHOLAR's QUESTION-BOOK:

OR, A

PRACTICAL INTRODUCTION

TO

ARITHMETIC.

CONTAINING A

GREAT VARIETY OF EXAMPLES

IN ALL THE

FUNDAMENTAL RULES.

TO WHICH IS NOW SUBJOINED,

A SUPPLEMENT,

CONSISTING OF

OCCASIONAL DIRECTIONS FOR LEARNERS.

BY THOMAS MOLINEUX.

THE SECOND EDITION,

CORRECTED AND ENLARGED.

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TO THE

REV. HENRY INGLES, A. M.

THIS

INTRODUCTION TO ARITHMETIC,

ORIGINALLY DESIGNED

FOR THE USE OF

MACCLESFIELD-SCHOOL,

IS,

WITH THE GREATEST RESPECT,

INSCRIBED,

BY HIS OBLIGED

AND MOST OBEDIENT SERVANT,

THE AUTHOR.

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ARITHMETIC.

ARITHMETIC is the art of computing by numbers; the fundamental rules of which are NUMERATION, ADDITION, SUBTRACTION, MULTIPLICATION, and DIVISION.

NUMERATION

IS the reading of any propoſed number, expreſſed in figures.

NUMERATION TABLE.

Trillions.	6	Hundred thouſand trillions, &c.
	5	Ten thouſand trillions.
	4,	Thouſand trillions.
	3	Hundred trillions.
	2	Ten trillions.
	1.	Trillions.
Billions.	9	Hundred thouſand billions.
	8	Ten thouſand billions.
	7,	Thouſand billions.
	6	Hundred billions.
	5	Ten billions.
	4.	Billions.
Millions.	3	Hundred thouſand millions.
	2	Ten thouſand millions.
	1,	Thouſand millions.
	9	Hundred millions.
	8	Ten millions.
	7.	Millions.
Units.	6	Hundred thouſands.
	5	Ten thouſands.
	4,	Thouſands.
	3	Hundreds.
	2	Tens.
	1.	Units.

The ſubſequent periods are termed quatrillions, quintillions, ſextillions, ſeptillions, octillions, and nonillions.

Note 1. Of theſe ten characters or figures, 1, 2, 3, 4, 5, 6, 7, 8, 9, 0, the nine firſt are called ſignificant figures, to diſtinguiſh them from the cipher, which, of itſelf, is inſignificant.

2. Any figure in the unit's place expreſſes ſo many ones, in the ten's place, ſo many tens, in the hundred's place, ſo many hundreds, and ſo on. Thus, in theſe figures, 2376; the 6 is 6 ones, the 7, being in the ten's place, repreſents 7 tens, that is, ſeventy, the 3 is 3 hundreds, and the 2 is 2 thouſands. The number expreſſed by theſe figures, therefore, is two thouſands, three hundreds and ſeventy-ſix.

3. It will be obvious from the preceding note, that the values of numbers increaſe in a tenfold proportion, counting towards the left-hand; and, that

4. A cipher being put on the right-hand of other figures, increaſes their value in the ſame tenfold proportion. Thus, 3 repreſents 3 ones, 30 is 3 tens, that is, thirty, 300 is 3 hundreds, &c.

To read any propoſed number, expreſſed in figures.

1. Divide the given number into periods and half periods, as in the numeration table. Then begin at the left-hand, and read towards the right.

2. To the ſimple value of each ſignificant figure join the name of its place, and at the end of each period write its proper name, except it be the unit's period, whoſe name is not expreſſed.

EXAMPLE.

Expreſs in words, 308400927.

1. 308. 400, 927.

2. Three hundred and eight millions, four hundred thouſands, nine hundreds, and twenty-ſeven.

EXAMPLES.

Write in words at length the following numbers, namely,

1. 7—2. 13—3. 56—4. 71—5. 80—6. 231—7. 509 —8. 590—9. 601—10. 810—11. 916—12. 3511 —13. 2048—14. 5107—15. 4005—16. 7900— 17. 3102—18. 2114—19. 30000—20. 50100— 21. 61040—22. 40351—23. 65011—24. 73400— 25. 81196—26. 10010—27. 500000—28. 340770 —29. 510300——30. 800800——31. 907004—— 32. 110201——33. 4001100——34. 5060030—— 35. 9301205—36. 7100039——37. 8054540—— 38. 1015000—39. 1101100——40. 50317107—— 41. 21007017—42. 31013310—43. 80800000—— 44. 14020710—45. 100430000—46. 306411903 —47. 730400050—48. 903600500—49. 500030005 —50. 10001060—51. 611061108—52. 6110100000 —53. 250090030097——54. 66140000400000——
55. 10111002160019000—
56. 7023005400081310002006—
57. 61715900000057004010160.

NOTATION

IS the expreſſing in figures, any number propoſed in words.

To expreſs in figures any number propoſed in words.

1. Make dots to ſo many places as are required, and divide them into periods, as in the former rule.

2. Write ſignificant figures in thoſe places, which are named in the given number, and

3. Inſert ciphers in the vacant places.

EXAMPLE.

Write down in figures, ſeven millions, forty thouſands, ſix hundreds, and five.

1. ., . . ., . . .
2. 7, . 4 ., 6 . 5
3. 7, 040, 605

EXAMPLES.

Expreſs in figures.

1. Ten—2. Sixty-five—3. Eighty-three—4. Forty—5. Two hundreds, and thirty-ſeven—6. Five

hundreds, and ſeventy—7. Seven hundreds, and ſeventeen—8. Six hundreds, and one—9. Eight hundreds, and twelve—10. Two hundreds, and eleven —11. One thouſand, three hundreds, and ſixty-five —12. Six thouſands, ſeven hundreds, and one— 13. Four thouſands, and fifty-nine—14. Eight thouſands, and three hundreds—15. Five thouſands, and ſix—16. Three thouſands, and twenty—17. Nine thouſands, one hundred, and fourteen—18. Forty thouſands, three hundreds, and forty-five—19. Thirty thouſands, and one hundred—20. Fifty thouſands, and ſix—21. Fifty-ſix thouſands, and eighteen —22. Seventy-four thouſands, and three hundreds— 23. Ninety thouſands, and ten—24. One hundred thouſands—25. Four hundred and eighty-three thouſands, ſix hundreds, and ſeventy—26. Three hundred and ten thouſands, and fifty—27. Five hundred and two thouſands, and eight hundreds— 28. One hundred and two thouſands, and ninety-three—29. Six hundred and one thouſands, and thirteen—30. Seven millions, and four hundred and eighty-ſeven thouſands—31. Eight millions, eighty thouſands, and eight hundreds—32. Fifteen millions—33. Two millions, one hundred thouſands, and forty-four—34. Three millions, forty-three thouſands, four hundreds, and thirty—35. One million, ten thouſands, and ten—36. Four millions, two hundred thouſands, three hundreds, and five—37. Nine millions, and twenty thouſands— 38. Thirty millions, and thirty thouſands—39. Ten millions, four hundred and one thouſands, and ninety —40. Fifty-four millions, twenty-two thouſands, and ſix hundreds—41. Ninety-four millions, nine hundred and four thouſands, nine hundreds, and forty— 42. Five millions, fourteen thouſands, and forty— 43. Forty-three millions, five hundred and ten thouſands, and nineteen—44. Two hundred millions, three hundred and ſixty thouſands, and one hundred —45. Five hundred and thirty thouſands, ſix hundreds, and ten—46. Four hundred and ſeven millions, three hundreds, and eleven—47. Eight hundred and eighty millions, fifty-ſix thouſands and ſeventy—48. Seven hundred millions, one hundred and fifteen thouſands, and one hundred—49. Six hundred and one millions, fourteen thouſands, one hundred, and one—50. Forty millions, and eleven thouſands—51. Twelve millions, three hundred and forty thouſands, and four hundreds—52. Three hundred and eighteen millions, five hundred and fifty thouſands, and five hundreds—53. One hundred and twenty-three millions, four hundreds, and fifty-ſix—54. Three hundred and ten millions, one thouſand, and thirteen—55. Seven thouſand and forty millions, and forty—56. Sixteen thouſand and one millions, and one hundred and ſixty thouſands—57. Nine billions, ninety-nine thouſand millions, and nine hundred and ninety thouſands—58. One hundred and twenty thouſand billions, one hundred thouſands, and twenty.

SIMPLE ADDITION.

ADDITION is the finding of one number, equal to ſeveral given numbers, taken all together. The number found is called their *ſum*, or *total*.

To find the ſum of ſeveral given numbers.

The numbers being written under one another, in their proper places, add up the units, and put down the right-hand figure of the ſum, carrying the reſt to the next column. Proceed in the ſame manner till you come to the laſt column, of which ſet down the whole ſum.

Proof. Add the numbers together in a contrary order.

EXAMPLES.

1.	2.	3.	4.	5.
7	8	17	42	79
9	4	21	36	61
3	9	46	84	27
5	7	88	33	88
8	5	32	51	3
2	8	54	68	12

6.	7.	8.	9.
19	342	126	967
81	178	353	594
76	653	718	216
59	809	201	763
94	170	539	742
78	423	249	385

10.	11.	12.	13.
313	726	573	3156
217	879	721	4989
870	10	306	8792
310	354	28	6137
397	823	63	385
645	243	58	21

14.	15.	16.	17.
4831	8005	8743	1966
628	3976	8149	2468
5531	3389	1594	2865
547	6324	3842	5632
961	4757	493	8456
654	8490	922	9382
237	64	723	3257

18.	19.	20.	21.
5554	2548	4312	1151
4975	2696	8714	2546
6753	334	386	6290
4617	8988	7126	764
3423	157	9110	613
4326	5998	3916	4731
1329	4121	732	5214

22.	23.	24.	25.
7617	4823	1437	4186
9171	152	6370	7931
5454	2346	5148	289
6203	583	283	3002
8029	6001	362	61
984	7968	4122	781
319	4339	423	43

26.	27.	28.	29.
54838	59176	45723	28731
37643	32764	75389	3825
42312	5783	20660	713
49082	6894	80458	2519
99789	28344	23672	231
83567	3713	6873	124
65829	18796	11653	88298

30.	31.	32.	33.
19867	37745	142782	875213
58394	72981	378695	523152
2321	5843	269783	362789
4751	6126	281598	856897
42003	25143	992576	137148
178	3751	41671	623174
6527	68750	982165	287422
		87243	349127

34.	35.	36.	37.
781324	873515	379413	721093
225968	362875	488279	843700
86427	874355	4632	2062
431957	612687	831772	43831
46347	931378	63412	4213
72124	7328	733954	89678
586	988241	692	3257
4233	23591	385	39538

38.	39.	40.	41.
517826	361474	1920362	4351832
383711	972238	321537	2397414
79643	36216	8528694	872316
271236	83453	23524	531432
359214	23748	172163	875726
642231	423548	329827	37086
35601	575787	93628	1472384
945873	56930	152939	31568

42.	43.	44.
5634185	622877	2763850
2730599	3241521	3514827
785632	28776	6273134
4726	2938	3566311
10027	89591	2143146
528	217328	6721455
3526	52884	7328142
3135	838259	5234601

45.	46.	47.
3684725	81211300	72413604
5148721	4372154	43214716
3428147	71465349	51486721
2384145	21977442	2374848
492615	40925972	7723837
787271	43264510	1472651
4214233	83276143	43125274
724361	2551578	34575291
	15929372	152789

48.	49.	50.
58374619	32834577	27359611
47861521	13412751	10273516
37254913	23371241	2597460
2316733	3742142	21284187
6423158	92805739	6278359
5124176	32467521	14632771
36231432	8104627	83980001
4943561	32185962	4512563
61679287	9236428	5943401

51.
3284123
354819
897782
43159
46371
807142
23589
25518823
385061

52.
954286
47414876
5014458
711254
50170998
8174325
721314
83892421
2786574

53.
46018500
8283063
92178035
18846127
43296758
1647493
58768753
2318056
62183514

54.
46317698
92879683
65938672
31374523
42876528
52943799
92834217
3486712
85984762
32765428

55.
12703964
45869732
59287426
34271420
81473278
2167831
18471652
49712231
72564135
1314728

56.
42381070
492635
102984
51753
6734207
43291
621473
330410
1538

57.
23470015
42833760
615274
8311
99837843
2481372
83197
34278142
713

58.
357804117
489763132
716421273
653914871
827689143
714968204
523867143
819358478
312757869
284198174

59.
836173281
271234626
325272319
658349271
396285148
453621898
531917829
747980355
617283490
14270809

60.
37281647
49817078
55263481
7231542
36829
8562350
38716293
438526
104788

61.
46287986
31798
4876854
2383
31281678
82345
703251
14816
7109

62.	63.
4958263705	8135006007
3872134819	7243612482
268732342	4569372386
9786524371	8265376248
834937685	32408762
2176214382	5796582319
7297459	2314281678
685972830	510352837
368795764	9795344719
6814238645	1734895629
87956876	5678979898

SIMPLE SUBTRACTION.

SUBTRACTION is the finding how much one number exceeds another, or the taking of a leſs number from a greater, and thereby ſhews the *difference*, or *remainder*.

The greater number is called the *minuend*, and the leſs the *ſubtrahend*.

To find the difference between any two given numbers.

1. Place the leſs number under the greater, and take each figure in the lower line from that which ſtands above it, and ſet down the remainders.

2. When the lower figure is greater than that above it; add *ten* to the upper number, from the ſum ſubtract the lower, ſet down the remainder, and carry *one* to the next lower number.

Proof. Add the remainder and ſubtrahend together, and if the ſum is equal to the minuend, the anſwer is right.

EXAMPLES.

1. From	47	54	382	935	3156
take	32	26	125	742	2137

2. From

2. From	6371	8325	4013	7168
ſubtract	213	412	2201	709
3. From	62507	42830	73069	
ſubtract	31607	2841	417	
4. From	83002	120350	327091	
ſubtract	48114	82610	284761	
5. From	802314	135710	397286	
take	31032	21628	298162	
6. From	200135	5873129	7305083	
ſubtract	109008	328014	2802731	
7. From	9461001	8172536	6378018	
ſubtract	814092	2781617	673041	
8. From	5201823	9175801	4920481	
take	2712644	1285374	4910987	
9. From	2306172	4001819	8600807	
take	826287	1283721	328142	
10. From	4286730	3816080	1370800	
ſubtract	2198745	27908	812715	
11. From	7000010	2601304	6253021	
ſubtract	4102094	2500897	4037	

12. From	4681035	3861400	6001000
take	316	3712508	60010
13. From	71216003	91040029	26735208
ſubtract	28391767	90300010	3192816
14. From	67348090	83706321	43002718
deduct	8690412	71492816	12003717
15. From	74689010	13062108	81012765
ſubtract	31689247	4823167	7028138
16. From	70000000	97260839	32918370
take	710905	310071	28170053
17. From	54980100	29326107	30021000
ſubtract	31280293	21281299	37099
18. From	81000471	889287102	816832701
deduct	3106716	281819213	37142819
19. From	306111052	238761351	150879146
take	5681728	721184	85568271
20. From	463510031	10000000	2116677333
ſubtract	7142839	100109	38100478
21. From	279632202	920001070	710206706
ſubtract	745813	818431	331049

22. From	273615492	1932501600	1234567890
ſubtract	273538007	86649662	987654321

23. From	2078014000	407103524	3010007238
ſubtract	9125408	5140	99609

SIMPLE MULTIPLICATION.

MULTIPLICATION is the finding of a number which ſhall contain a given one, any propoſed number of times. The two given numbers are called the *factors* of the multiplication, the greater of which is termed the *multiplicand*, and the leſs the *multiplier*; alſo, the number found is called their *product*.

MULTIPLICATION TABLE.

1	2	3	4	5	6	7	8	9	10	11	12
2	4	6	8	10	12	14	16	18	20	22	24
3	6	9	12	15	18	21	24	27	30	33	36
4	8	12	16	20	24	28	32	36	40	44	48
5	10	15	20	25	30	35	40	45	50	55	60
6	12	18	24	30	36	42	48	54	60	66	72
7	14	21	28	35	42	49	56	63	70	77	84
8	16	24	32	40	48	56	64	72	80	88	96
9	18	27	36	45	54	63	72	81	90	99	108
10	20	30	40	50	60	70	80	90	100	110	120
11	22	33	44	55	66	77	88	99	110	121	132
12	24	36	48	60	72	84	96	108	120	132	144

To multiply by any number, not exceeding 12.

Begin at the right-hand, and multiply each figure in the multiplicand by the given number, obſerving the ſame rule for ſetting down the *products*, which was given reſpecting the *ſums* in addition.

Proof. 1. Caſt the nines out of the two *factors*, and ſet down the remainders.

2. Multiply the two remainders together, and reject the nines in the product; then if the exceſs of the nines in the anſwer is equal to this laſt remainder, the queſtion is right.

EXAMPLES.

1.	372459	2.	168372
	2		3

3. 861825 × 4.   4. 734692 × 5.
5. 7133864 × 6.   6. 870046 × 7.
7. 362791 × 8.   8. 4967583 × 9.
9. 7299548 × 10.   10. 8472539 × 11.
11. 4927836 × 12.   12. 4316783 × 2.
13. 21703585 × 3.   14. 4651739 × 4.
15. 3679540 × 5.   16. 80273645 × 6.
17. 76197824 × 7.   18. 29384657 × 8.
19. 69443578 × 9.   20. 31827949 × 11.
21. 8720469534 × 12.

To multiply by any number, not exceeding 12, having ciphers to the right-hand.

Multiply as before, by the ſignificant figures, and annex as many ciphers to the product, as there are ciphers in the given multiplier.

22. 87362714 × 10.   23. 51358297 × 30.
24. 13579753 × 100.   25. 60174758 × 500.
26. 13646240 × 40.   27. 82956000 × 900.
28. 58850463 × 110.   29. 41973481 × 80.
30. 7423000 × 6000.   31. 2634079 × 1200.
32. 4073292 × 2000.   33. 34567870 × 1000.

The following examples to be done in one line, by the method uſually denominated back-figure, the nature of which is beſt explained by the operation.

34. 3265431 × 13.
35. 3292734 × 14.
36. 7126059 × 15.
37. 3261735 × 16.
38. 1040016 × 18.
39. 9348273 × 17.
40. 2996397 × 19.
41. 1208914 × 115.
42. 12345679 × 18.
43. 10188938 × 113.
44. 3312671 × 26.
45. 1302440 × 34.
46. 2003059 × 870.
47. 664454 × 104.
48. 4282902 × 107.
49. 450372 × 1002.
50. 672324 × 211.
51. 345387 × 710.

To multiply by any number which is greater than 12, *and the product of two numbers in the multiplication table.*

Multiply continually by its component parts, uſing the greater number firſt in multiplication, and the reverſe in diviſion. The nearer to equality that theſe parts are taken, the better. For inſtance, of the component parts of 24, 6 and 4, 8 and 3, 12 and 2,—6 and 4 are the beſt.

52. 47391526 × 14.
53. 38562047 × 15.
54. 78610094 × 16.
55. 19993779 × 22.
56. 13647283 × 25.
57. 32844679 × 27.
58. 96217865 × 32.
59. 27458393 × 35.
60. 37456982 × 42.
61. 73867921 × 45.
62. 34917897 × 49.
63. 7397896 × 540.
64. 6224971 × 550.
65. 42679523 × 56.
66. 80389273 × 63.
67. 52450386 × 66.
68. 3617856 × 720.
69. 3916479 × 840.
70. 62143183 × 88.
71. 76100734 × 96.
72. 7453621 × 1080.
73. 56419273 × 121.
74. 46301820 × 13200.
75. 92860294 × 144.

To multiply by a number conſiſting of ſeveral figures.

1. Multiply by each figure in the multiplier, beginning at the right-hand, and ſetting down the firſt figure of every product ſtraight under the figure you multiply by.

2. Add all the lines together, and the ſum will be the product required.

76. 6492538 × 13. 77. 9012836 × 19.
78. 1723896 × 26. 79. 3198724 × 31.
80. 4742693 × 370. 81. 2173749 × 46.
82. 7834276 × 58. 83. 3891207 × 690.
84. 2971826 × 74. 85. 5629137 × 82.
86. 62874379 × 95. 87. 323749 × 807.
88. 960253478 × 231. 89. 201673439 × 3720.
90. 761283459 × 5074. 91. 516400328 × 6509.
92. 834630517 × 727. 93. 46538273 × 80903.
94. 190735628 × 2345. 95. 728395642 × 7943.
96. 386015766 × 84065.
97. 23546007 × 755080.
98. 467301708 × 730201.
99. 229568400 × 94073.
100. 3287652000 × 8416500.
101. 2861997683 × 382074.
102. 6431872300 × 914620000.
103. 1368172438 × 10390027.
104. 5710364821 × 723856.
105. 7314671810 × 19300657.
106. 2184806003 × 7140862.
107. 4938165203 × 6659380.
108. 21983164213 × 8274386.
109. 35206328000 × 210508367.
110. 51964463700 × 3806475900.
111. 46873122217 × 15830467.
112. 432184682214 × 813450186.
113. 814395648812 × 8920703816.
114. 321827645782 × 9700230105.
115. 842958794231 × 371486592.

The following examples are done by methods, ſufficiently curious, but not generally adapted to the common courſe of teaching. Explanations, at large, may be ſeen in HUTTON'S ARITHMETIC, *Pa.* 15, VYSE'S KEY TO THE TUTOR'S GUIDE, *Pa.* 50, and GORDON'S INSTITUTES OF ARITHMETIC, *Pa.* 29.

116. 2143271 × 62′. 117. 3748796 × 147′.
118. 1041546 × 2′6. 119. 2166085 × 153′.
120. 3571058 × 2117′. 121. 2480246 × 324′24.

122. 66179380 × 5'3515.
123. 30145900 × 246582.'
124. 13713357 × 903'364.
125. 38690494 × 1681284.
126. 20635441 × 3'367'359.

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127. 837856 × 999.
128. 615634 × 99999.
129. 38575 × 1111.
130. 6084872 × 2222.
131. 151277 × 55555.
132. 587903 × 3333.
133. 481027 × 6666.
134. 346215 × 9998.
135. 786345 × 996.

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136. 4867339 × 5.
137. 36457047 × 25.
138. 2634559 × 175.
139. 437935 × 75.

SIMPLE DIVISION.

DIVISION is the finding how oft one number is contained in another.

There are four parts in diviſion:

Firſt. The *dividend*, or number to be divided.

Second. The *diviſor*, or number to divide by.

Third. The *quotient*, or number of times the diviſor is contained in the dividend.

Fourth. The *remainder*, which is always leſs than the diviſor.

Note. The laſt remainder is of the ſame name with the dividend.

To divide by any number, not greater than 12.

Find how often the diviſor is contained in the firſt figure of the dividend, or in the firſt two figures, when the firſt is leſs than the diviſor, and ſet down the quotient figure under the dividend. The remainder (if any) muſt be carried to the next figure as ſo many tens, and the whole divided as before, till all the figures of the dividend have been uſed. Write the laſt remainder above a ſmall line with the diviſor below it.

Proof. Multiply the quotient by the diviſor, taking in the remainder, and the product will be equal to the dividend, when the quotient is right.

Ex-

EXAMPLES.

1. 2 | 462834

2. 3 | 634779

3. 4859701÷4.
4. 2903473÷5.
5. 458010÷6.
6. 216157÷7.
7. 943842÷8.
8. 8047813÷9.
9. 4925846÷11.
10. 6389724÷12.
11. 2796834÷2.
12. 5817617÷3.
13. 7562700÷4.
14. 3647872÷5.
15. 9112875÷6.
16. 7980693÷7.
17. 2945277÷8.
18. 43054681÷9.
19. 81007037÷11.
20. 83150071÷12.

To divide by any number, not greater than 12, having ciphers to the right-hand.

Cut off the ciphers in the diviſor, and as many of the laſt figures of the dividend; then divide by the ſignificant figures of the diviſor, as before, and to the laſt remainder join thoſe figures of the dividend, which were cut off, and write the whole remainder over the given diviſor.

When the diviſion terminates without a remainder, the number cut off will be the remainder.

21. 3941187÷20.
22. 2726453÷10.
23. 2102735÷50.
24. 7411282÷300.
25. 3062166÷700.
26. 4527670÷40.
27. 1930701÷100.
28. 2819030÷1100.
29. 1393055÷9000.
30. 12725200÷120.
31. 5244003÷600.
32. 23133000÷1000.

To divide by any number, which is greater than 12, and the product of two numbers in the multiplication table.

Divide continually by its component parts, and the laſt quotient will be the anſwer. Then, multiply the ſecond remainder by the firſt diviſor, to the productſt add the firſt remainder, and the ſum will be the whole remainder.

33. 95163765÷15. 34. 60873136÷16.
35. 85967213÷21. 36. 20017665÷22.
37. 24279564÷24. 38. 43980164÷25.
39. 147930842÷27. 40. 18256944÷36.
41. 482859585÷45. 42. 38494756÷48.
43. 94503820÷55. 44. 848563167÷630.
45. 202540873÷640. 46. 453978348÷66.
47. 3914013848÷720. 48. 603561462÷81.
49. 472897046÷84. 50. 40237580900÷8800.
51. 7932542791÷96. 52. 4238711306÷99.
53. 485614731609÷10800.
54. 6752038477÷121. 55. 5714293849÷132.
56. 9837492480÷144.

LONG DIVISION.

1. Find how many times the diviſor is contained in a competent number of figures of the dividend, and write the figure expreſſing the number of times, in the quotient.

2. Multiply the diviſor by the quotient figure, and ſubtract the product from the ſaid dividend figures.

3. Join the next figure of the dividend to the right-hand of the remainder, and find the number of times the diviſor is contained in this number, which place in the quotient; then multiply, ſubtract, and bring down, as before, till every figure of the dividend is uſed.

MAXIMS IN LONG DIVISION.

When the ſubtrahend is greater than the minuend, the quotient figure is too large; on the contrary, when the remainder is greater than the diviſor, the quotient figure is too ſmall.

Or, in other words,

The number to be ſubtracted muſt never *exceed that* from which it is to be ſubtracted,—when it does, the figure in the quotient is too large.

The number which remains, before a figure is brought down, muſt always be *leſs* than the diviſor, —when it is *equal*, or *greater*, the figure in the quotient is too ſmall.

57. 13)15873(

58. 40188÷17.

59. 81587÷23.

60. 854219÷37.

61. 2700862÷43.

62. 3136558÷59.

63. 907874÷65.

64. 314900391÷780.

65. 4770123÷87.

66. 96095350÷95.

67. 98164780÷7400.

68. 134142894÷318.

69. 17645324905÷5370.

70. 43152225141 84÷744.

71. 1044346430057÷4295000.

72. 7791471800÷60183.

73. 66158428602÷7923.

74. 268081496399÷37026.

75. 5037057704900÷613200.

76. 7320620266000÷59417.

77. 12808540599 66÷73629.

78. 169755214525000÷8027500.

79. 147863083835 74÷270173.

80. 64459230897533÷6618720.

81. 72277526669699÷9473506.

82. 3484094183776976÷73800496.

83. 183486891373104210÷47392518.

84. 61111656251663731 28÷92730586.

To perform Long Diviſion, without ſetting down the products.

The quotient figures are found in the uſual way, but, inſtead of ſetting down the products, ſuch a figure is ſet down as will make a ſum, ending with the figure of the dividend, which ſtands over it, carrying the tens to the next product.——When the quotient figure is *one*, the ſubtraction may be performed as in the common method of ſubtracting.

85. 157859÷13.

86. 731816÷34.

87. 29814483÷57.

88. 6746525÷437.

89. 652735800÷216.

90. 122371451671÷625100.

91. $33149155216 \div 7062$.
92. $19537334784200 \div 300940$.

To divide by a mixed number.

Multiply the integral part of the diviſor by the denominator of the fraction, and take in the numerator, for a new diviſor. Multiply, alſo, the dividend by the ſame denominator, and the product will be a new dividend.

Ex. $26345671 \div 5\frac{1}{2}$

$$\begin{array}{r|l}
5\frac{1}{2} & 26345671 \\
2 & 2 \\
\hline
\text{New diviſor } 11 & 52691342 \text{ new dividend.} \\
\hline
 & 4790122 \text{ the quotient.} \\
\hline
\end{array}$$

93. $48634565 \div 8\frac{1}{2}$.
94. $765867564 \div 30\frac{1}{4}$.
95. $173548 \div 7\frac{1}{2}$.
96. $16442524 \div 73\frac{5}{8}$.

REDUCTION.

REDUCTION is the converting of numbers from one denomination to another, ſo as to retain the ſame value. When great names are to be reduced to leſſer,——multiply by ſo many of the leſſer as make one of the greater: on the contrary, when ſmall names are to be brought to greater,——divide by as many of the leſſer as make one of the greater.

MONEY.

20 ſhillings	make	1	pound.
12 pence			ſhilling.
4 farthings			penny.

			s.	*d.*
Note.	A moidore	was	27	0
	A mark	—	13	4
	An angel	—	10	0
	A noble	—	6	8

Farthings.	Pence.	Shillings.	Pound.
960	240	20	1
48	12	1	
4	1		

EXAMPLES.

1. Reduce 13 pounds to ſhillings.
2. Reduce 25 ſhillings to pence.
3. In 340 ſhillings, how many pounds?
4. Reduce 43 pence to farthings.
5. In 628 pence, how many ſhillings?
6. How many pence are in 35 farthings?
7. In 1770 ſhillings, how many pounds?
8. Reduce 73 pounds to ſhillings, and take in 7 ſhillings.
9. Reduce 14 pence to farthings, and take in 2 farthings.
10. How many ſhillings are in 203 pence?
11. Reduce 391 ſhillings to pence, and take in 9 pence.
12. In 5611 ſhillings, how many pounds?
13. How many ſhillings are in 47*l.* 13*s*?
14. Reduce 37 pounds to ſhillings, and pence.
15. Reduce 8*l.* 15*s.* 6*d.* to pence.
16. In 100*l.* 13*s.* how many ſhillings?
17. How many ſhillings, and pounds are in 1731 pence?
18. In 51128 pence, how many pounds?
19. Reduce 54*l.* 0*s.* 3*d.* to farthings.
20. How many pounds are in 25155 farthings?
21. Reduce 63*l.* 12*s.* 4¼*d.* to farthings.
22. In 32*l.* 10*s.* 11½*d.* how many farthings?
23. In 2083081 farthings, how many pounds?
24. Reduce 734*l.* 19*s.* 0¼*d.* to farthings.

TROY-

TROY-WEIGHT.

12 ounces	make 1	pound.
20 penny-weights		ounce.
24 grains		penny-weight.

Gold, ſilver, and jewels are weighed by troy-weight.

Grains.	Penny-weights.	Ounces.	Pound.
5760	240	12	1
480	20	1	
24	1		

EXAMPLES.

25. In 78 pounds of ſilver, how many ounces?
26. In 93 penny-weights, how many grains?
27. Reduce 6 ounces to penny-weights, and take in 2 *dwts.*
28. Reduce 301 pounds of gold to *oz.* and *dwts.*
29. How many pounds are in 290 *oz?*
30. In 141 *lb.* 0 *oz.* 11 *dwts.* how many *dwts?*
31. How many *oz.* are there in 277 *dwts?*
32. Reduce 7 *dwts.* to grains, and take in 22 *grs.*
33. In 75840 *dwts.* how many *oz.* and *lbs?*
34. Reduce 250 *lb.* 11 *oz.* 0 *dwts.* 16 *grs.* to grains.
35. How many pounds are in 45062 *dwts?*
36. Reduce 4821452 grains to pounds.

AVOIRDUPOIS-WEIGHT.

20 hundred	make 1	ton.
4 quarters, or 112 pounds		hundred.
28 pounds		quarter.
16 ounces		pound.
16 drams		ounce.

Bread, grocery, and all metals, except ſilver, and gold, are weighed by this weight.

Note. A fother is 19½ hundreds.
A firkin of butter — 56 pounds.
A ſtone — 14 pounds.
A great pound — 24 ounces.

Drams.	Ounces.	Pounds.	Quarters.	Hundreds.	Ton.
573440	35840	2240	80	20	1
28672	1792	112	4	1	
7168	448	28	1		
256	16	1			
16	1				

1 *lb.* avoirdupois is equal to 1 *lb.* 2 *oz.* 11 *dwts.* 15½ *grs.* troy.

EXAMPLES.

37. In 93 *cwt.* of lead, how many quarters?
38. In 7312 ounces, how many pounds?
39. Reduce 823 quarters to pounds.
40. In 1334 *cwt.* how many tons?
41. In 28 *cwt.* 1 *qr.* 6 *lb.* how many pounds?
42. How many *oz.* and pounds are in 68448 drams?
43. In 95088 pounds of ſugar, how many *cwt?*
44. In 7 *t.* 12 *cwt.* 3 *qr.* of iron, how many quarters, and *lbs?*
45. Reduce 104 *lb.* 3 *oz.* of cinnamon to ounces, and drams.
46. How many ounces, and great pounds, are in 9127 drams of ſilk?
47. How many tons are in 10422 pounds?
48. In 32 *cwt.* 0 *qr.* 21 *lb.* of tobacco, how many pounds?

APOTHECARIES-WEIGHT.

12 ounces make 1 pound.
8 drams make 1 ounce.
3 ſcruples make 1 dram.
20 grains make 1 ſcruple.

Medicines are compounded by this weight; but druggiſts buy and ſell their articles by avoirdupois.

Grains.

Grains.	Scruples.	Drams.	Ounces.	Pound.
5760	288	96	12	1
480	24	8	1	
60	3	1		
20	1			

1 *lb.* apothecaries is equal to 1 *lb.* troy.

EXAMPLES.

49. Reduce 108 pounds of opium to ounces, and drams.

50. In 80940 grains, how many ſcruples, and drams?

51. In 37 *dr.* 2 *ſcr.* how many ſcruples?

52. How many ounces are in 1115 drams?

53. How many pounds are in 359 ounces?

54. In 32 *lb.* 10 *oz.* 3 *dr.* 1 *ſcr.* 14 *gr.* how many grains?

CLOTH-MEASURE.

6 quarters make 1 French ell.
5 quarters make 1 Engliſh ell.
4 quarters make 1 yard.
3 quarters make 1 Flemiſh ell.
4 nails make 1 quarter.

Note. A nail is $2\frac{1}{4}$ inches.

Inches.	Nails.	Quarters.	Yard.
36	16	4	1
9	4	1	
$2\frac{1}{4}$	1		

EXAMPLES.

55. Reduce 8 yards to quarters, and take in 3 *qrs.*

56. In 11 Engliſh ells, how many quarters?

57. In 1308 quarters, how many Flemiſh ells?

58. How many quarters are in 732 nails?

59. In 79 yards of Iriſh linen, how many quarters, and nails?

60. In 63 *ells Fl.* 1 *qr.* how many quarters?

61. Reduce 19 *yds.* 2 *qr.* 3 *nls.* of cambric to nails.

62. How many Engliſh ells are in 748 nails?

63. How many quarters, and yards are in 423 nails of muſlin?

64. Reduce 292 *qrs.* 2 *nls.* of Holland, to nails.

65. In 21 *ells Fr.* 0 *qrs.* 2 *nls.* how many nails?

66. How many Flemiſh ells are in 2101 nails?

LONG-MEASURE.

60 nautical or geographical miles, or 69½ ſtatute miles	make 1	degree.
3 miles		league.
8 furlongs, or 1760 *yds.*		ſtatute mile.
40 poles		furlong.
5½ yards, or 11 half *yds.*		pole or perch.
6 feet, or 2 yards		fathom.
3 feet		yard.
12 inches		foot.
3 barley-corns		inch.

Note. A hand is 4 inches.

Barley-corns.	Inches.	Feet.	Yards.	Poles.	Furlongs.	Mile.
190080	63360	5280	1760	320	8	1
23760	7920	660	220	40	1	
594	198	16½	5½	1		
108	36	3	1			
36	12	1				
3	1					

EXAMPLES.

67. Reduce 79 yards to feet.

68. How many inches are there in 294 feet?

69. How many miles are in 2310 furlongs?
70. Reduce 121 *fur.* 10 *pls.* to poles.
71. Reduce 58 poles to yards.
72. How many poles are in 99 yards?
73. How many poles are in 73 yards?
74. In 311 poles, how many yards?
75. In 12 *yds.* 1 *f.* 7 *in.* how many inches?
76. Reduce 4 *mls.* 0 *fur.* 20 *pls.* to poles.
77. Reduce 7835 *mls.* 246 *yds.* to yards.
78. In 1573593 yards, how many miles?

SQUARE or LAND-MEASURE.

4 roods } make 1 { acre.
40 ſquare poles } make 1 { rood.

Note. 30¼ ſquare yards make a ſq. pole.
9 ſquare feet —— a ſq. yard.
144 ſquare inches —— a ſq. foot.

Square inches.	Sq. feet.	Sq. yards	Sq. poles.	Roods.	Acre.
6272640	43560	4840	160	4	1
1568160	10890	1210	40	1	
39204	272¼	30¼	1		
1296	9	1			
144	1				

SOLID-MEASURE.

27 cubic feet } make 1 { cubic yard.
1728 cubic inches } make 1 { cubic foot.

Cubic inches.	Cubic feet.	Cubic yard.
46656	27	1
1728	1	

EXAMPLES.

79. Reduce 27 acres to roods, and take in 3 roods.
80. How many roods are in 831 poles?

81. In 31 acres of ground, how many roods, and poles?
82. Reduce 15 *a.* 2 *r.* 38 *p.* to poles.
83. In 29520 poles, how many roods, and acres?
84. How many poles are in 897 *a.* 0 *r.* 10 *p?*
85. Reduce 70200 poles to acres.
86. How many acres are in 3429 poles?

WINE-MEASURE.

2 pipes, or 4 hogſheads	make 1	tun.
2 hogſheads		pipe, or butt.
84 gallons		puncheon.
63 gallons		hogſhead.
42 gallons		tierce.
$31\frac{1}{2}$ gallons		barrel.
18 gallons		rundlet.
10 gallons		anker.
4 quarts, or 8 pints		gallon.
2 pints		quart.

Wines, brandies, ſpirits, ſtrong waters, perry, cider, vinegar, honey, mead, and milk are meaſured by this meaſure.

Pints.	Gallons.	Tierces.	Hogſheads.	Puncheons.	Pipes.	Tun.
2016	252	6	4	3	2	1
1008	126	3	2	$1\frac{1}{2}$	1	
672	84	2	$1\frac{1}{3}$	1		
504	63	$1\frac{1}{2}$	1			
336	42	1				
8	1					

Note. 231 cubic inches make 1 gallon.

EXAMPLES.

87. In 62 hogſheads, how many gallons?
88. In 3038 pints, how many quarts, and gallons?
89. Reduce 43 *hhds.* to gallons, and quarts.
90. In 3 *tuns,* 1 *hhd.* 42 *gal.* of Madeira, how many gallons?

91. How many gallons, and *hhds.* are in 7308 quarts of port?

92. Reduce 150 *ank.* 7 *gal.* of rum to gallons, and quarts.

93. How many tuns are in 6792 gallons of claret?

94. In 13 pipes, how many quarts?

95. In 214051 pints, how many puncheons?

96. How many rundlets are in 3885 gallons?

97. Reduce 207 *punch.* 71 *gal.* to quarts.

98. In 25 tuns, how many quarts?

ALE and BEER-MEASURE.

54 gallons	make 1	hogſhead of beer.
48 gallons		hogſhead of ale.
4 firkins		barrel of ale or beer.
2 firkins		kilderkin.
9 gallons		firkin of beer.
8 gallons		firkin of ale.
4 quarts, or 8 pints		gallon.
2 pints.		quart.

In the country,
8½ gallons make 1 firkin of Ale or Beer.

A L E.

Pints.	Gallons.	Firkins.	Kilderkins.	Barrel.	Hogſhead.
384	48	6	3	1½	1
256	32	4	2	1	
128	16	2	1		
64	8	1			
8	1				

B E E R.

Pints.	Gallons.	Firkins.	Kilderkins.	Barrel.	Hogſhead.
432	54	6	3	1½	1
288	36	4	2	1	
144	18	2	1		
72	9	1			
8	1				

In the country,

Pints.	Gallons.	Firkins.	Kilderkins.	Barrel.	Hogſhead.
408	51	6	3	1½	1
272	34	4	2	1	
136	17	2	1		
68	8½	1			
8	1				

Note. 282 cubic inches make 1 gallon.

EXAMPLES.

99. In 17 barrels of ale, how many firkins, and gallons?

100. Reduce 1425 quarts of beer to gallons.

101. Reduce 35 barrels of beer to firkins, gallons, and pints.

102. In 726 *hhds.* of beer, how many gallons, and quarts?

103. How many gallons, and *hhds.* are in 10176 quarts of ale?

104. Reduce 19 *bar.* 2 *fir.* 4 *gal.* of beer to gallons.

105. How many pints are in 341 *hhds.* 32 *gal.* 3 *qts.* 1 *pt.* of ale?

106. In 909 gallons of ale, how many barrels?

107. In 203 *bar.* 6 *gal.* 5 *pts.* of ale, how many pints?

108. How many barrels are in 9272 pints of beer?

109. In 23749 pints of ale, how many *hhds*?

110. In 29966 quarts of beer, how many kilderkins?

WINCHESTER or DRY-MEASURE.

2 ways, or 10 quarters	make 1	laſt.
5 quarters		way.
36 buſhels		chaldron.
8 buſhels		quarter.
2 buſhels		ſtrike.
4 pecks		buſhel.
2 gallons		peck.
4 quarts, or 8 pints		gallon.
2 pints		quart.

In the country,
32 buſhels make 1 chaldron.

Pints.	Gallons.	Pecks.	Buſhels.	Quarters.	Ways.	Laſt.
5120	640	320	80	10	2	1
2560	320	160	40	5	1	
512	64	32	8	1		
64	8	4	1			
16	2	1				
8	1					

The buſhel, water-meaſure, contains 5 pecks.

Note. $268\frac{4}{5}$ cubic inches make 1 gallon.

EXAMPLES.

111. In 23 quarters of corn, how many buſhels?
112. How many pecks are in 161 gallons?
113. In 2906 pecks, how many buſhels?
114. In 367 quarts of corn, how many buſhels?
115. How many pecks are in 442 *qrs.* 5 *buſh.* 3 *pks.* of wheat?
116. Reduce 278 *ch.* 34 *buſh.* of coals to buſhels.
117. In 3898 pecks of wheat, how many quarters?
118. In 24967 buſhels of oats, how many laſts?
119. How many chaldrons are in 9727 pecks?
120. How many quarts are in 1 ſtrike?

TIME.

365 days, 6 hours	make 1	Julian or common year.
4 weeks		month.
7 days		week.
24 hours		day.
60 minutes		hour.
60 ſeconds		minute.
60 thirds		ſecond.

Note. A ſolar year is 365 *d.* 5 *h.* 48 *m.* 57 *ſ.* 39 *th.*

Note. The year is divided into 12 calendar months, viz. January, February, March, April, May, June, July, Auguſt, September, October, November, and December.

The number of days in each month.

Thirty days have September,
April, June, and November;
February has twenty-eight alone:
And all the reſt have thirty-one.

In leap-year, February has 29 days.

Minutes.	Hours.	Days.	Weeks.	Month.
40320	672	28	4	1
10080	168	7	1	
1440	24	1		
60	1			

8766 hours make 1 Julian year.

EXAMPLES.

121. Reduce 16 *hrs.* 40. *min.* to minutes.
122. In 271 days, how many weeks, and months?
123. Reduce 11 days to hours, and minutes.
124. Reduce 9 *mo.* 17 *hrs.* to hours.
125. Reduce 2 *mo.* 3 *dys.* 16 *min.* to minutes.
126. In 4266900 ſeconds, how many minutes, hours, and days?
127. How many weeks are in 5076 hours?
128. How many months are in 5900 hours?
129. In 53289 minutes, how many weeks?
130. How many thirds are in a ſolar year?

MOTION.

12 ſigns, or 360°	make	1 great circle.
30°		1 ſign.
15°		1 hour.
60′		1°
60″		1′
60‴		1″.

EXAMPLES.

131. In 180°, how many minutes, and ſeconds?
132. In 21° 10′ 43″, how many ſeconds?
133. How many degrees are in 670 minutes?
134. How many thirds are in 1 ſign?
135. How many thirds are in a great circle?
136. What is the ſun's place in the ecliptic, his longitude being 700809 ſeconds?

COMPOUND ADDITION.

To find the ſum of ſeveral numbers, conſiſting of divers denominations.

Add the numbers in the loweſt denomination together, and reduce* the ſum to the next ſuperior denomination, write down the remainder, and carry the quotient to the next column, of which find the ſum, and reduce it as before. Proceed, in the ſame manner, through all the denominations, to the higheſt.

When there are two places of figures in one column, firſt add the units together, and then the tens, as in *Simple Addition*.

PENCE TABLES.

d.		*s.*	*d.*	*d.*		*s.*
20	are	1	8	24	are	2
30	——	2	6	36	——	3
40	——	3	4	48	——	4
50	——	4	2	60	——	5
60	——	5	0			
70	——	5	10	72	——	6
80	——	6	8	84	——	7
90	——	7	6	96	——	8
100	——	8	4	108	——	9
110	——	9	2	132	——	11
120	——	10	0	144	——	12

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* Pence are, generally, reduced to ſhillings by the following tables. In all other caſes, the reduction is performed by diviſion.

EXAMPLES *of* MONEY.

	l.	*s.*	*d.*		*l.*	*s.*	*d.*		*l.*	*s.*	*d.*
1.	5	3	7	2.	7	1	4	3.	5	2	3
	2	6	3		4	3	9		9	7	8
	6	2	1		8	2	5		2	4	6
	1	8	4		2	5	6		7	9	2
	3	7	5		8	6	6		1	8	5
4.	9	6	10	5.	8	15	5	6.	2	6	8
	3	8	7		9	3	5		7	15	1
	6	12	9		1	7	10		3	7	9
	5	3	2		4	16	3		2	10	6
	7	7	9		2	5	11		9	4	4
7.	2	13	4½	8.	3	17	6	9.	4	7	0¾
	4	14	9		7	16	7¾		3	2	8
	3	18	4¼		5	14	2		1	6	5¼
	9	7	3		6	11	8½		5	0	11
	8	15	7		4	19	2		6	3	10
10.	7	16	2½	11.	8	12	3	12.	1	5	3
	1	3	9		3	15	10¾		6	10	9¼
	4	11	8¾		7	6	11		2	16	3¾
	2	9	3		8	16	5¾		8	4	11
	8	10	4¼		9	2	7¼		7	13	7½
	5	9	7		3	8	1		2	19	0¾
13.	6	2	7	14.	5	19	3¼	15.	3	17	11
	5	11	4½		3	7	11¼		0	14	6¾
	4	0	11		9	13	5¾		2	6	4
	1	7	8¾		6	0	2½		5	19	7½
	9	15	10		5	8	7		1	5	1½
	3	19	8		7	10	0		8	19	10

	l.	s.	d.		l.	s.	d.		l.	s.	d.
16.	2	8	11	17.	7	5	4½	18.	7	15	3¼
	7	12	2¼		9	10	9¼		4	0	2¾
	7	14	3		1	0	5¼		6	17	10½
	2	13	10¾		7	13	8		7	6	9
	8	12	11½		7	9	10¼		9	18	1¾
	1	7	7¼		1	6	11		5	11	10¾

19.	46	17	6¼	20.	18	11	9½	21.	92	9	8¾
	2	15	10¾		6	13	10		5	10	6
	95	2	0½		74	5	7¾		64	18	7¾
	58	3	5¾		3	18	2½		38	6	3
	8	14	3½		8	9	6		49	15	1¼
	66	16	11		81	16	4¾		4	19	3¼
	9	12	2		7	11	4½		2	7	8½

22.	12	11	6¼	23.	4	1	10¾	24.	14	16	7
	3	16	10½		22	19	6¼		27	17	11¼
	17	2	11		1	6	5½		41	6	4½
	56	13	7¼		14	17	0¾		65	11	6
	91	13	11		58	2	11½		17	6	0¾
	76	4	5¼		2	0	6		47	10	10¼
	14	11	3		76	14	11		9	13	4

25.	27	8	0¼	26.	48	11	6	27.	93	2	8½
	41	17	8		32	18	4¾		47	14	3¼
	12	10	6		9	0	6¼		29	19	5
	25	12	7¼		14	17	0½		72	5	8¾
	11	11	0		73	4	5¾		8	10	3
	62	0	6½		7	13	9¼		17	12	8½
	83	1	5¾		51	6	11		4	16	7¼
									6	5	0½

	l.	s.	d.		l.	s.	d.		l.	s.	d.
28.	12	6	1	29.	52	5	3¼	30.	14	3	8
	24	9	6¼		5	18	6¼		36	19	5
	50	1	3½		48	12	9¼		21	2	7¾
	27	19	0¼		10	0	7		7	12	10
	38	0	4		66	13	11		83	7	3½
	63	2	10¼		31	0	4½		48	15	2¾
	21	15	8½		1	3	10		15	0	8¼
	7	1	5		49	16	7		33	11	4½

31.	76	14	7¾	32.	27	18	5¾	33.	92	16	5¼
	13	12	1½		50	1	8¾		37	14	9½
	19	3	8¾		38	9	4		4	10	0¾
	14	14	6¼		44	0	3		16	8	3
	71	10	9		15	16	1¼		59	13	10½
	9	3	5¼		71	2	7		24	17	2¾
	32	15	3½		4	15	10		39	6	10
	18	11	4¾		45	19	2½		5	2	6¼

34.	88	16	11½	35.	23	9	4¼	36.	60	15	5½
	26	14	5¼		54	17	9		48	13	1¾
	9	7	2½		6	0	11		93	18	6
	36	12	4¾		28	13	5¾		7	7	10½
	41	18	3		65	18	7¼		35	19	4¼
	27	3	8¼		92	6	4¾		73	6	9½
	4	15	11½		7	16	0½		31	17	3
	12	19	6		14	5	10		59	14	10¾

37.	94	1	9¼	38.	53	11	4½	39.	68	19	5¾
	88	2	6½		6	2	8		84	7	3½
	46	5	11¾		18	5	3¼		8	6	5¾
	29	16	3½		26	10	7½		25	11	9½
	48	12	0		42	0	4¾		9	13	7
	5	17	7		64	2	2		47	15	6¾
	61	13	8¼		71	18	10¾		32	1	3
	7	14	10¼		3	14	11½		1	18	0½
	12	18	5½		90	0	6¾		2	16	4

	l.	s.	d.		l.	s.	d.		l.	s.	d.
40.	75	12	8½	41.	39	14	4½	42.	78	12	5
	40	0	6¼		97	11	2¼		17	14	8½
	3	17	4		73	15	10½		35	0	6
	24	19	5¾		6	10	11¼		28	16	10¼
	59	15	2½		30	2	9		11	8	3½
	82	6	5¾		16	19	5¾		49	15	7¾
	7	18	4½		58	16	1½		6	11	4¾
	33	2	9¼		2	13	7		62	15	3
	8	10	0¼		81	0	3½		5	18	4¾

43.	27	13	10¾	44.	15	12	7¾	45.	57	6	11½
	56	14	7¾		43	17	3¼		34	17	9¾
	83	9	4½		23	15	11¼		79	14	3½
	9	7	4		17	6	3½		19	12	10¾
	80	18	11¼		38	4	10		31	19	11
	74	19	7½		85	18	11¾		5	7	6¼
	14	6	2¾		64	13	6		96	18	3¾
	51	18	3¼		53	10	9½		87	9	5
	8	15	6		2	10	5¾		3	11	10

46.	91	14	5	47.	22	18	0¼	48.	77	16	7¼
	72	15	6¼		66	4	8¾		95	5	2¾
	89	7	10½		99	13	6		36	5	11
	7	19	2¾		8	10	10¼		92	14	9½
	98	13	7		2	11	3		65	13	5¾
	63	16	0¼		76	19	7¼		37	17	0
	70	0	5¾		44	12	9½		41	0	4¾
	45	17	7		69	15	7¾		60	18	0¼
	20	13	9¼		93	15	1¼		72	11	11

49.	274	12	7	50.	442	11	4½
	502	6	4		971	5	9¼
	89	2	2¼		59	14	7¾
	193	17	0		261	19	2½
	51	3	10		512	7	9½
	440	18	3		830	2	6
	28	15	10		87	10	0
	65	11	9½		13	0	3½
	649	10	1		391	17	8¼

	l.	s.	d.
51.	829	13	8
	73	17	1
	92	18	3
	58	16	7¾
	4	17	2
	7	19	8½
	16	2	9¼
	30	14	5¾
	1	5	3½
	24	10	7

	l.	s.	d.
52.	732	16	6
	658	14	4¾
	828	10	7¼
	41	9	4½
	66	17	9
	182	15	2¼
	356	4	0½
	77	3	6
	94	16	0
	227	0	0¼

53.	647	7	10
	84	18	2
	103	19	4
	69	17	9
	285	18	6¾
	9	0	3
	26	15	5
	143	3	10½
	2	11	4
	0	4	7

54.	100	14	7
	67	5	9¼
	911	12	8¼
	72	6	11
	38	14	9½
	54	19	4¾
	96	1	10
	46	12	0½
	18	7	10
	12	5	1

55.	397	18	5½
	53	18	2¼
	75	13	3¼
	3	16	10½
	8	10	4¾
	6	2	11
	9	16	5½
	4	19	5¾
	2	7	3
	32	10	1½

56.	945	5	9¼
	465	3	8¼
	682	12	8¾
	771	6	5
	49	14	11¾
	33	18	7¼
	86	11	3½
	579	7	10¼
	237	13	9
	56	19	2¾

	l.	s.	d.
57.	538	13	7½
	152	18	4½
	837	4	8¼
	594	16	2
	368	16	11¼
	911	7	3½
	99	15	9
	84	19	6
	77	12	7¾
	19	5	7¾

	l.	s.	d.
58.	264	11	2¼
	81	16	6½
	473	14	10
	380	19	3½
	51	15	11
	162	18	4¾
	637	13	5
	926	2	7¼
	598	6	2½
	749	4	6

	l.	s.	d.
59.	738	11	9
	375	15	4
	832	16	5
	96	18	10¾
	47	5	11
	628	12	11
	52	19	6¾
	88	3	10
	497	1	5
	3	11	7¼

	l.	s.	d.
60.	454	9	3
	203	15	9¼
	37	0	6
	86	4	10½
	72	13	8
	40	16	3
	8	10	10½
	21	1	4
	65	11	2¼
	9	16	3¾

	l.	s.	d.
61.	1000	3	8
	751	5	3¼
	439	16	4
	818	17	10¾
	364	10	6½
	117	14	1¾
	596	19	11½
	283	18	7¾
	672	12	9¼
	837	13	8½
	558	19	4¼
	803	11	2
	929	16	5

	l.	s.	d.
62.	8117	18	10¾
	7294	19	8¾
	4679	13	11¼
	9748	15	5½
	2864	17	10½
	592	16	9¼
	883	19	7¾
	439	12	6½
	377	14	8½
	923	11	6¾
	865	18	9¾
	749	17	10
	928	15	8½

EXAMPLES *of* WEIGHTS *and* MEASURES.

TROY-WEIGHT.

	lb.	*oz.*	*dwts.*
63.	14	6	12
	17	5	3
	15	0	9
	2	7	15
	13	2	10
	4	1	5

	lb.	*oz.*	*dwts.*	*gr.*
64.	10	8	11	17
	42	5	16	12
	12	3	14	18
	51	6	10	22
	26	9	7	16
	27	4	18	23

	lb.	*oz.*	*dwts.*
65.	25	3	16
	12	9	17
	41	6	14
	33	10	0
	19	4	10
	7	9	12

	lb.	*oz.*	*dwts.*	*gr.*
66.	49	11	13	14
	38	6	4	23
	14	3	17	13
	6	7	16	19
	21	10	5	22
	30	9	15	15

AVOIRDUPOIS-WEIGHT.

	lb.	*oz.*	*dr.*
67.	18	11	14
	6	0	8
	24	14	0
	19	6	15
	5	0	7
	3	2	10

	tons.	*C.*	*q.*	*lb.*
68.	6	16	1	13
	13	10	0	20
	71	11	3	26
	25	19	1	18
	7	4	2	25
	29	7	3	12

	lb.	*oz.*	*dr.*
69.	39	15	14
	16	11	13
	23	12	7
	11	9	6
	0	6	4
	14	2	12

	tons.	*C.*	*q.*	*lb.*
70.	305	14	2	11
	18	18	0	0
	36	2	1	14
	119	13	3	27
	7	16	0	8
	2	9	1	16

APOTHECARIES-WEIGHT.

	lb.	*oz.*	*dr.*
71.	12	3	5
	10	1	4
	6	10	2
	5	6	6
	17	8	1
	4	7	3

	dr.	*ſc.*	*gr.*
72.	3	2	15
	0	1	13
	2	2	11
	7	0	17
	5	2	14
	6	1	0

	lb.	*oz.*	*d.*	*ſc.*
73.	46	11	4	1
	15	3	7	1
	34	9	4	0
	73	10	5	2
	16	5	1	2
	9	2	5	0

CLOTH-MEASURE.

	yds.	*qrs.*	*nls.*
74.	34	3	2
	27	1	2
	83	2	3
	59	3	1
	46	1	3
	5	2	2

	E. e.	*qrs.*	*nls.*
75.	11	3	1
	60	2	0
	9	4	2
	7	1	2
	4	2	3
	6	0	2

	Fl. e.	*q.*	*nls.*
76.	65	1	3
	26	2	1
	24	0	1
	82	2	3
	33	0	3
	7	1	1

	yds.	*qrs.*	*nls.*
77.	43	3	1
	36	1	2
	54	2	3
	17	1	3
	25	3	2
	62	1	1
	38	2	2

	E. e.	*qrs.*	*nls.*
78.	120	0	0
	94	4	1
	110	2	0
	81	1	2
	56	4	3
	64	3	1
	79	2	3

	Fr. e.	*qrs.*	*nls.*
79.	37	0	1
	16	2	1
	28	3	3
	57	1	2
	46	5	1
	87	4	3
	61	2	2

LONG-MEASURE.

	mls.	*fur.*	*pls.*
80.	27	2	13
	89	5	26
	2	7	30
	10	2	38
	7	4	0
	8	3	10
	6	0	24

	yds.	*ft.*	*in.*	*b.c.*
81.	214	1	3	2
	183	2	11	2
	97	0	8	1
	49	2	7	2
	5	1	6	1
	30	1	3	0
	2	1	4	1

	ft.	in.	b. c.
82.	351	9	1
	107	10	2
	42	6	0
	55	9	2
	24	11	0
	6	4	1
	19	7	2

	L.	mls.	fur.	pls.
83.	20	1	6	13
	23	1	7	27
	21	0	4	16
	26	1	3	32
	32	2	6	1
	15	1	2	28
	9	1	5	39

LAND-MEASURE.

	ac.	r.	p.
84.	452	3	28
	14	1	35
	15	2	16
	30	2	35
	29	3	7
	346	1	23
	61	3	11

	ac.	r.	p.
85.	382	1	34
	618	3	14
	100	1	27
	74	2	19
	63	1	31
	55	3	38
	47	0	6

	ac.	r.	p.
86.	721	2	15
	94	3	32
	36	2	29
	59	3	28
	265	1	17
	27	0	30
	83	1	39

WINE-MEASURE.

	ru.	gal.	p.
87.	26	14	5
	3	17	1
	8	12	6
	17	13	7
	5	15	0
	97	6	2
	2	11	3

	tuns.	hhd.	g.	q.
88.	22	1	39	3
	7	3	34	2
	3	2	58	3
	11	3	43	1
	37	1	16	3
	8	0	31	2
	9	3	7	0

	pun.	gal.	p.
89.	46	18	3
	34	41	7
	9	51	4
	17	65	2
	23	2	5
	1	74	0
	15	27	1

	tuns.	hhd.	g.	q.
90.	18	3	15	1
	13	0	42	3
	4	1	36	1
	49	3	43	2
	16	2	56	1
	52	3	20	0
	7	1	19	3

ALE *and* BEER-MEASURE.

	b.	*a.*	*f.*	*g.*
91.	130	3	5	
	71	3	7	
	48	1	6	
	6	2	7	
	19	1	4	
	5	0	2	
	27	2	7	
	34	0	1	

	hhd.	*b.*	*g.*	*q.*
92.	66	29	3	
	83	42	2	
	7	53	0	
	4	26	3	
	78	37	1	
	5	18	3	
	10	52	1	
	57	4	3	

	b.	*b.*	*f.*	*g.*	*p.*
93.	173	1	7	4	
	154	3	5	3	
	61	0	8	7	
	23	1	6	4	
	86	2	3	5	
	18	1	5	6	
	117	3	0	2	
	2	2	4	0	

	b.	*b.*	*f.*	*g.*
94.	381	2	6	
	37	3	7	
	43	2	5	
	16	1	4	
	4	3	8	
	71	3	0	
	5	1	2	
	8	3	7	

	hhd.	*a.*	*g.*	*q.*
95.	54	16	2	
	35	38	1	
	73	11	3	
	46	25	2	
	59	24	3	
	7	47	3	
	12	32	2	
	89	15	1	

	b.	*a.*	*f.*	*g.*	*p.*
96.	731	1	4	5	
	79	0	7	3	
	526	2	3	0	
	122	1	5	0	
	55	3	4	7	
	43	1	6	4	
	534	2	1	6	
	84	3	6	5	

WINCHESTER *or* DRY-MEASURE.

	q.	*b.*	*p.*
97.	71	6	2
	36	4	3
	92	7	3
	8	6	1
	43	4	0
	97	2	3
	9	1	0
	4	5	2

	b.	*p.*	*g.*
98.	505	3	0
	24	2	1
	4	3	1
	93	2	0
	6	2	1
	73	3	0
	2	0	1
	38	1	0

	ch.	*b.*	*p.*
99.	51	18	3
	94	12	1
	5	26	3
	39	17	1
	61	34	2
	7	15	2
	31	23	1
	3	19	2

	q.	*b.*	*p.*
100.	87	2	3
	29	4	1
	6	5	2
	18	4	1
	44	6	2
	32	3	0
	0	7	3
	1	5	1

	p.	*g.*	*pt.*
101.	40	1	3
	17	1	2
	34	1	7
	33	0	4
	7	1	7
	9	0	1
	56	1	5
	8	1	6

	ch.	*b.*	*p.*
102.	91	34	1
	74	16	2
	42	14	1
	6	28	3
	23	5	1
	8	27	3
	9	32	2
	10	28	1

TIME.

	m.	*w.*	*d.*
103.	19	2	6
	6	1	4
	22	3	5
	7	2	3
	2	1	6
	17	3	2
	11	3	4
	9	1	3

	w.	*d.*	*h.*	*min.*
104.	57	4	22	38
	64	6	13	47
	5	3	21	19
	36	2	18	15
	78	6	9	59
	49	0	20	6
	1	5	14	48
	23	3	7	24

	d.	*h.*	*min.*
105.	62	7	47
	18	12	54
	76	21	16
	34	9	20
	99	23	31
	3	22	28
	15	4	58
	64	16	13

	m.	*w.*	*d.*	*h.*
106.	12	3	1	15
	1	3	2	16
	4	1	6	14
	68	3	1	12
	5	2	5	23
	9	3	4	7
	6	0	6	11
	7	1	3	19

EXERCISE in NUMERATION, &c.

1. Expreſs in words 501007 pounds.
2. Write down in words 3030010 ſhillings.
3. Write in words 700000200 quarter guineas.

4. Expreſs in words 90000010000 tons of iron.

5. Write in words 413041304130040013 inches.

6. Expreſs in words 64*l.* 12*s.* 4$\frac{1}{2}$*d.*

7. Expreſs in words 10*l.* 0*s.* 6$\frac{1}{4}$*d.*

8. Write in words 8305*l.* 19*s.* 0$\frac{3}{4}$*d.*

9. Expreſs in figures thirty thouſand, and ſeven hundred pounds, Bank Stock.

10. Write down in figures one hundred millions, and ten thouſand pounds, India Stock.

11. Write down ten thouſand and nineteen millions, and two hundred thouſand guineas.

12. Expreſs in figures ſeventeen millions, and ſeven hundred and ninety thouſand hogſheads of wine.

13. Set down two hundred and ſeventy pounds, thirteen ſhillings, and nine-pence farthing.

14. Set down one hundred and ten pounds, and three-pence halfpenny.

15. Write in figures three hundred and nine pounds, ſeven ſhillings, and a farthing.

LITERAL NOTATION.

Note 1. A leſs character before a greater leſſens its value.

2. A leſs character after a greater increaſes its value.

3. Any number with a line over it ſignifies ſo many thouſands.

4. V and L are never repeated; and no character is repeated more than four times.

I	= 1.	C	=100.
III	= 3.	LXXX	=80.
V	= 5.	XC	=90.
IV	= 4.	D	=500.
VI	= 6.	CD	=400.
X	= 10.	DCC	=700.
VIII	= 8.	M	=1000.
IX	= 9.	CM	=900.
XIX	= 19.	MM	=2000.
XX	= 20.	$\overline{\text{VI}}$	=6000.
L	= 50.	$\overline{\text{L}}$	=50000.
XL	= 40.	$\overline{\text{M}}$	=1000000.

Expreſs numerically the following numbers.

1. XXIX—2. DLXX—3. DC—4. LD—5. XLM —6. $\overline{\text{IX}}$—7. MD—8. MDCCLXXVI—9. $\overline{\text{L}}$XXX.

Expreſs literally the following numbers.

10. 34—11. 102—12. 3090—13. 470—14. 10800 —15. 100000.

QUESTIONS IN ADDITION.

1. What is the ſum of the following numbers, *viz.* 5271, 169, 147, 4689, 596, and 64?

2. What is the ſum of 63745, 9162, 778, 8047, 57239, and 250?

3. Find the ſum of theſe numbers, 579367, 422919, 45367, 894523, 78250, 57401, and 30078.

4. Required the ſum of 100, 73029, 7971, 5061942, 8417, 99, and 31315.

5. *Euclid*, the geometrician flouriſhed about 277 years before the birth of *Chriſt*; how many years is it ſince, the queſtion being propoſed *anno domini* 1787?

6. How long is it ſince the building of *London*, ſuppoſing it to have been built 1108 years before the birth of our *Saviour*?

7. *Troy* was taken and burnt by the *Greeks* 1184 years before the birth of *Chriſt*; how many years is it ſince?

8. Suppoſe I was born in the year   ; in what year ſhall I be 21 years of age?

9. The diſtance of Jupiter from the ſun is computed to be four hundred and twenty-ſix millions of miles; Saturn's, ſeven hundred and eighty millions: what is the diſtance between theſe remote planets in oppoſition?

10. The mean diſtance between the Earth and Sun being eighty-one millions of miles, and between the Earth and Moon, two hundred and forty thouſands;

it is required to find the diſtance between the Sun and Moon in a lunar eclipſe.

11. There are two numbers, the greater of which exceeds the leſſer by 18; the leſſer number is 62: required the greater, and the ſum of both.

12. A gentleman left to his eldeſt daughter ſix thouſand and five hundred pounds more than to the youngeſt; the fortune of the youngeſt was forty-ſix thouſand, ſeven hundred and fifty pounds: what was the eldeſt daughter's fortune, and the ſum of both?

13. From *November* 10, 1786, to *December* 17 following, both days incluſive, how many days?

14. How many days are in the twelve calendar months?

15. From *May* 14, 1787, incluſive, to *October* 6, following, excluſive, how many days?

16. How many days are contained between the 7th of *May*, 1787, and the 24th of *April*, 1788, both days incluſive?

17. From *February* 6, 1787, excluſive, to *December* 9, following, incluſive, how many days?

18. From *Maccleſfield* to *Knutsford* is 12 miles; from thence to *Northwich* 7 miles; and thence to *Cheſter* 17 miles: what is the diſtance from *Maccleſfield* to *Cheſter*?

19. From *Mancheſter* to *Stockport* is 7 miles; from *Stockport* to *Maccleſfield*, 13 miles; thence to *Leek*, 12; from *Leek* to *Sand*, 18; from thence to *Litchfield*, 17; from *Litchfield* to *Birmingham*, 16; from thence to *Henley*, 14; thence to *Stratford*, 8; thence to *Shipton*, 11; thence to *Chapel-houſe*, 10; thence to *Woodſtock*, 10; and from *Woodſtock* to *Oxford*, 8 miles: how many miles are between *Mancheſter* and *Oxford*?

20. Add the following ſums together, *viz.* 25*l.* 12*s.* and 5*d*; 18*l.* 8*s.* and 10$\frac{3}{4}$*d*; 9*l.* and 15*s*; 13*l.* 6*s.* and 11$\frac{1}{2}$*d*; 11*l.* and 8*d*; and 16*l.* 16*s.* and 4*d.*

21. Add together 101*l.* and 10$\frac{1}{2}$*d*; 8*l.* 19*s.* and 7$\frac{3}{4}$*d*; 53*l.* 10*s.* and $\frac{3}{4}$*d*; 242*l.* and 9*d*; 30*l.* and 1$\frac{1}{2}$*d*; and 10*l.* 17*s.* and 6*d.*

22. Mr. *M.* owes me 5 guineas; Mr. *N.* 13 pounds, and half a crown; Mr. *O.* 8 pounds, and 9

9 pence; and Mr. *P*. 6 pounds, 10 ſhillings, and a halfpenny: what is due to me in all from theſe four perſons?

23. *A* owes *B* for *Cheſhire* cheeſes 13*l*. 11*s*. and 10¼*d*; for *Stilton ditto*, 37*l*. 14*s*. and 11*d*; for *Glouceſter ditto*, 10*l*. and 2½*d*; and for *Suffolk* butter, 8*l*. 3*s*. and 9*d*: how much is *A* indebted to *B*?

24. A perſon borrowed a certain ſum, and having paid in part thereof, 502*l*. 5*s*. and 6½*d*, the remainder to pay is 30*l*. 13*s*. and 3¾*d*: required the ſum borrowed.

25. Paid ſundry accounts, as follow, *viz*. Servants wages 51*l*. 2*s*. and 11*d*; Butcher's bills 47*l*. 13*s*. and 9½*d*; Grocer's *ditto*, 3*l*; Baker's, 12*l*. 3*s*. and 6¾*d*; Taylor's, 16*l*. 1*s*. and 10*d*; and Draper's, 36*l*. 13*s*. and 8*d*: what was the whole ſum paid?

26. I owe to one perſon 3*l*. and 7*d*; to another 11*s*. and 10½*d*; to another 1*l*. and 5*s*; to another 6*s*. and ½*d*; to another 19*s*. and 9*d*; and to another 10*l*. and 10*d*. How much do I owe in all?

27. *Congleton*, *June* 22, 1787.

Mr. *Robert Hodgſon*,

Bought of *John Whitfield*.

			s.	*d*.		*l*.	*s*.	*d*.
6 *yds*.	of broad cloth,	at	16	6	*per yd*.	4	19	0
18 ——	ſuperfine ditto,	—	19	3	——	17	6	6
9 ——	ſerge, —	—	3	4	——	1	10	0
10 ——	drugget, —	—	6	6	——	3	5	0
19 ——	ſhalloon,	—	1	7	——	1	10	1
12 ——	gray cloth,	—	15	8½	——	9	8	6

Required the amount of this Bill.

28. *Maccleſfield, Auguſt* 3, 1787.

Mr. *C. Egerton*,

Bought of *William Gould*.

		s.	d.		l.	s.	d.
2 *lbs.* of bohea, congou leaf,	at	6	6	*per lb.*	0	13	0
1 *lb.* of ſuperfine hyſon,	—			———	0	17	6
3½ *lbs.* of coffee,	—	— 4	2	———	0	14	7
2¼ *do.* Sir *H. Sloan's* milk chocolate,		6	0	———	0	13	6
24 *do.* of lump ſugar,	—		10½	—	1	1	0
A loaf of double refined, 18½ *lbs.*				—	1	4	8¼

Required the amount.

29. *London, May* 20, 1787.

Mrs. *Woodmaſon*,

Bought of *Fernyhough* and Co.

		s.	d.	l.	s.	d.
5 *yds.* of flowered ribband,	at	1	4½	0	6	10½
4 pair of ſilk gloves,	—	5	3¾	1	1	3
4 pair of fine kid ditto,	—	2	4	0	9	4
5 white ſarcenet hoods,	—	5	9¼	1	8	10¼
6 fans, *French* paper mount,	—	3	2¼	0	19	1½
A piece of *Mechlin* lace,	—			10	15	6

30. *Mancheſter, June* 14, 1787.

Mrs. *Drinkwater*,

Bought of *Phillips* and Co.

		s.	d.		l.	s.	d.
14¼ ells of dowlas,	at	1	8	*per ell*	1	3	9
8¾ ells of holland,	—	4	3½	———	1	17	6½
A piece of cambric,	—			———	4	14	3
40½ ells of diaper,	—	1	6¼	———	3	1	7
A piece of muſlin,	—			———	3	7	10
20 ells of damaſk,	—	4	6½	———	4	10	10

31. **DISBURSEMENTS.**

1787.
May 13th, Laid out in lamb, ten groats, . . .
——— in ſallad, one penny, - . . .
14th, ——— in beef, half a crown, - . . .
——— in potatoes, 3 pence halfpenny, . . .
15th, ——— in parſnips, ſeven farthings, . . .
——— in bread, twenty-one pence, . . .
——— in butter, 17 pence farthing, . . .
16th, ——— in muffins, three halfpence, . . .
——— in fowls, ſix groats, - . . .
17th, ——— in coffee, ſix and ſix-pence . . .

. . .

32. Suppoſe I am indebted
To *A*, 16 pounds, 11 ſhillings, and 3 pence, . . .
— *B*, 31 pounds, and 7 pence, - . . .
— *C*, 5 pounds, 19 ſhillings, and 6 pence, . . .
— *D*, 13 pounds, and 10 pence farthing, . . .
— *E*, 7 guineas, - - . . .
— *F*, 210 pounds, - - . . .
— *G*, 12 pounds, and 18 ſhillings, - . . .
— *H*, 6 ſhillings, and 11 pence halfpenny, . . .
— *I*, 8 pounds, 14 ſhillings, and a farthing, . . .
— *K*, 4 pounds, 1 ſhilling, and 10 pence, . . .

What is the whole of my debt?

33. A ſilverſmith ſold 12 diſhes, weighing 13 *lbs.* 9 *oz.* 13 *dwts*; 12 plates, weighing 11 *lbs.* 8 *oz.* 10 *dwts*; 3 dozen of ſpoons, weighing 6 *lbs.* 4 *oz.* 4 *dwts*; 4 ſalts, weighing 1 *lb.* 9 *oz.* 7 *dwts*; and two tankards, weighing 5 *lbs.* 1 *oz.* 18 *dwts.* What quantity of plate did the Silverſmith diſpoſe of?

34. Bought of a Merchant in *London*, 3 bags of hops, No. 1. of which weighed 2 *C.* 1 *q.* 11 *lbs*; No. 2. 2 *C.* 2 *q*; and No. 3. 2 *C.* 27 *lbs*; alſo teas,

weighing 1 *q.* 23 *lbs*; and ſugars to the weight of 5 *C.* 3 *q.* 24 *lbs*: for how many hundred weight have I to pay carriage?

35. An Apothecary made a compoſition as follows: the firſt ingredient weighed 4 *lbs.* 6 *oz.* 8 *grs*; the ſecond, 7 *lbs.* 3 *dr*; the third, 11 *oz.* 1 *dr.* 2 *ſc.* 17 *grs*; and the fourth, 9 *lbs.* 4 *oz.* 1 *ſc.* What did the whole compoſition weigh?

36. Bought 5 bales of *Iriſh* linen, No. 1. of which contains 1546 *yds.* 2 *q.* 3 *n*; No. 2. 1473 *yds.* 3 *q.* 2 *n*; No. 3. 1627 *yds*; No. 4. 1305 *yds.* 3 *n*; and No. 5. 1469 *yds.* 3 *q.* How many yards do they all contain?

37. A gentleman at *A* inquiring the diſtance to *F*, received the following anſwer; from hence to *B* is 4 *m.* 7 *f*; from *B* to *C*, 3 *m.* 4 *f*; thence to *D*, 6 *m*; from *D* to *E*, 8 *m.* 2 *f*; and thence to *F.* 5 *m.* 3 *f.* The diſtance between *A* and *F* is required.

38. There are 5 fields, the firſt of which contains 3 *ac.* 1 *r.* 25 *p*; the ſecond, 5 *ac.* 33 *p*; the third, 2 *ac.* 3 *r.* 35 *p*; the fourth, 12 *ac.* 3 *r.* 20 *p*; and the fifth, 7 *ac.* 2 *r.* 8 *p.* What is the content of the whole?

39. A Wine-merchant, in the year 1786, imported in one veſſel 4 *t.* 3 *hhd.* 38 *gal.* of red port, and 3 *t.* 2 *hhd.* 53 *gal.* of mountain: in another, 4 *t.* 29 *gal.* of claret; and 3 *hhd.* 61 *gal.* of champaign: in another, 10 *t.* 2 *hhd.* 46 *gal.* of madeira. What quantity of wine did he import that year?

40. What is the ſum of 48 *yds.* 2 *f.* 7 *in*; 18 *yds.* 1 *f.* 3 *in*; 105 *yds.* 9 *in*; 11 *yds.* 2 *f*; and 200 yards?

41. A common brewer in the country ſent out at different times the following quantities, *viz.* 7 *b.* 2 *f.* 2½ *g*; 8 *b.* 3 *f.* 7 *g*; 3 *b.* 2 *f.* 8 *g*; 5 *b.* 3 *g*; and 6 *b.* 1 *f.* 7 *g.* What was the whole quantity ſent out?

42. What is the difference of longitude between *Conſtantinople*, and *Savannah*, in *Georgia*? *v. Guthrie.*

COMPOUND SUBTRACTION.

To find the difference between two given compound numbers.

1. Begin at the leaſt denomination, and ſubtract each number in the lower line from that which ſtands above it, and write down the remainders.

2. When the lower number is greater than that above it, ſubtract it from *one* of the next higher denomination, add the upper number to the remainder, which ſum will be the whole remainder, and carry *one* to the lower number of the next denomination.

EXAMPLES *of* MONEY.

	l.	*s.*	*d.*		*l.*	*s.*	*d.*
1. From	6	5	8	2.	4	17	6
take	1	3	4		3	7	6
3. From	5	3	4½	4.	8	13	0
take	4	0	1¼		3	4	4
5. From	7	10	4	6.	9	12	7¾
take	4	6	5		7	15	2¼
7. From	3	5	11½	8.	6	9	8¼
ſubtract	2	9	4½		5	3	3½
9. From	2	6	10	10.	41	4	6
ſubtract	0	10	3¼		7	13	2
11. From	38	7	4	12.	27	16	11¼
take	9	16	2½		18	4	0¾

	l.	*s.*	*d.*		*l.*	*s.*	*d.*
13. From	65	12	7	14.	76	5	6½
ſubtract	58	3	10¾		14	10	2
15. From	22	18	5	16.	81	15	3
ſubtract	2	7	6½		8	12	5¼
17. From	64	17	8½	18.	49	14	2½
ſubtract	9	2	8¾		6	0	4¼
19. From	17	1	10	20.	12	0	7¾
ſubtract	6	11	7½		11	14	2½
21. From	42	18	0	22.	25	11	6¼
ſubtract	13	10	6		18	8	11¾
23. From	83	7	1¾	24.	63	3	11¼
take	24	14	9¾		32	16	9½
25. From	21	16	9¾	26.	73	6	5¾
take	6	19	0		7	13	10
27. From	33	17	2¾	28.	46	17	0
take	1	19	4		4	14	8¼
29 From	94	2	8¼	30.	90	0	6
ſubtract	17	2	9		89	5	4½
31. From	74	19	4¼	32.	75	13	9
take	62	13	7¼		16	18	11¾

	l.	s.	d.		l.	s.	d.
33. From	59	16	3¾	34.	87	15	1½
take	28	5	5¼		7	10	10
35. From	39	7	10	36.	92	7	5¾
take	4	13	10½		82	0	6½
37. From	71	19	0¼	38.	10	4	3
take	3	19	6		9	19	5¼
39. From	57	18	9½	40.	273	11	7
take	45	17	11¾		104	15	8¾
41. From	553	1	4	42.	136	11	6¼
ſubtract	55	12	7		126	10	7¾
43. From	860	0	0	44.	391	6	0¼
take	71	4	7		91	9	8½
45. From	623	6	5	46.	414	3	0¼
ſubtract	30	12	10¼		29	12	11¾
47. From	173	14	9	48.	760	10	8
ſubtract	37	18	11¼		89	13	7¼
49. From	791	5	11¼	50.	812	0	0½
ſubtract	61	19	11½		2	19	1
51. Borr.	345	19	7¾	52.	621	15	3½
paid	345	17	9½		94	19	0¾

	l.	*s.*	*d.*		*l.*	*s.*	*d.*
53. From	396	19	7¼	54.	254	14	6
ſubtract	9	19	9		244	15	0½
55. From	214	0	5	56.	121	0	0
ſubtract	80	0	8¾		78	6	10¼
57. From	465	10	0½	58.	532	13	6¼
ſubtract	304	0	11¾		319	15	11
59. Borr.	408	17	4¼	60.	985	18	8¼
paid	54	1	10¾		27	9	9½
61. From	386	1	4	62.	359	3	10
take	77	11	3¾		1	4	2¼
63. From	638	4	4¼	64.	280	11	1¾
ſubtract	240	8	11¼		49	11	9
65. Lent	500	0	0	66.	519	14	7½
received	259	0	11½		490	14	10¾
67. From	641	0	8¼	68.	262	1	0¼
ſubtract	83	6	0¾		62	1	1
69. Lent	738	13	1	70.	220	4	9
received	451	19	0¼		32	5	10½
71. Borr.	910	0	1	72.	327	5	2
paid	909	0	1¼		199	12	8¾

	l.	s.	d.		l.	s.	d.
73. Dr.	235	0	7½	74.	465	13	10¼
creditor,	0	19	10½		19	16	11½
75. Borr.	901	6	2¼	76.	6001	18	10½
paid	91	6	2¾		911	12	11
77. From	1000	0	0	78.	1000	0	0
ſubtract	0	0	0¼		999	19	11¾

79.	l.	s.	d.	80.	l.	s.	d.
Borrowed	150	0	0	Lent	1000	9	1
Paid at different times.	52	17	7¾	Rec. at different times.	500	0	3½
	14	19	6½		39	11	4¾
	9	12	11¼		19	15	9¼
	3	18	5¾		8	17	11¾
	5	6	10½		21	19	6½
	1	15	4¾		5	12	3¾
	7	14	11¼		3	8	9¾
	8	13	2½		20	5	7¼
Paid,				Rec'd.			
Unpaid,				Due,			

81.

Suppoſe a perſon is Dr. to ſundry accompts the following ſums;

l.	s.	d.
35	13	2
9	6	1
8	5	9½
45	5	6
3	18	8¾
21	9	7
57	19	8½

And Cred. by ſundries the following;

l.	s.	d.
7	6	7¼
8	9	5
37	4	8½
13	8	5¾
86	17	4
4	3	9½
1	19	10
13	2	7¾
6	9	3

What is the balance of this accompt?

EXAMPLES *of* WEIGHTS *and* MEASURES.

TROY-WEIGHT.

	lb.	*oz.*	*dwts.*
82. From	25	7	13
take	18	10	14

	lb.	*oz.*	*dwts.*	*gr.*
83.	53	0	17	13
	13	11	19	23

	lb.	*oz.*	*dwts.*
84. From	44	11	0
ſubtract	30	11	16

	lb.	*oz.*	*dwts.*	*gr.*
85.	70	6	12	19
	49	8	16	21

AVOIRDUPOIS.

	lb.	*oz.*	*dr.*
86. Bought	19	0	14
ſold	8	2	11

	T.	*C.*	*q.*	*lb.*
87.	17	14	1	2
	1	15	0	3

	lb.	*oz.*	*dr.*
88. From	27	12	8
take	11	15	9

	T.	*C.*	*q.*	*lb.*
89.	540	13	3	16
	312	4	2	17

APOTHECARIES.

	lb.	*oz.*	*dr.*	*ſc.*
90. From	23	10	5	1
ſubtract	6	5	6	2

	lb.	*oz.*	*dr.*	*ſc.*	*gr.*
91.	84	11	7	0	4
	59	11	7	1	7

CLOTH-MEASURE.

	yds.	*q.*	*n.*
92. From	23	2	1
ſubtract	13	3	0

	E.e.	*q.*	*n.*
93.	210	1	0
	51	4	3

	F.e.	*q.*	*n.*
94.	35	2	3
	8	5	2

	yds.	q.	n.
95. Bought	228	3	2
ſold	23	3	3

	E.e.	q.	n.
96.	330	0	1
	43	1	1

	Fl.e.	q.	n.
97.	74	1	3
	16	2	1

LONG-MEASURE.

	ft.	in.	b.c.
98. From	294	8	0
ſubtract	56	10	1

	L.	mls.	fur.	pls.
99.	43	1	5	17
	8	2	0	19

	mls.	fur.	pls.
100. From	10	3	28
take	4	5	38

	yds.	ft.	in.	b.c.
101.	29	2	9	2
	8	2	11	1

LAND-MEASURE.

	ac.	r.	p.
102. From	372	1	21
ſubtract	46	0	31

	ac.	r.	p.
103.	729	3	3
	10	2	11

	ac.	r.	p.
104.	831	0	11
	800	1	29

WINE.

	tuns,	hhd.	gal.
105. From	23	1	54
take	17	3	59

	pu.	gal.	qu.	pi.
106.	35	76	2	0
	0	79	0	1

	ru.	gal.	pi.
107. Bought	15	0	6
ſold	2	5	5

	tuns,	hhd.	gal.	qu.
108.	77	2	28	1
	30	2	30	2

ALE *and* BEER.

	b.b.	f.	g.
109. From	492	2	6
take	311	3	7

	hhd.a.	g.	p.
110.	43	25	2
	14	32	4

	b.a.	*f.*	*g.*	*q.*
111. From	620	1	3	2
take	73	3	4	3

	b.a.	*f.*	*g.*
112.	23	3	4
	21	3	6

	hhd.b.	*g.*	*p.*
113. From	94	52	5
ſubtract	8	53	7

	b.b.	*f.*	*g.*	*q.*
114.	265	0	7	1
	91	3	7	3

WINCHESTER.

	q.	*b.*	*p.*
115. From	74	6	2
take	15	2	3

	p.	*g.*	*p.*
116.	79	0	1
	36	0	2

	ch.	*b.*	*p.*
117.	62	9	0
	9	12	2

	q.	*b.*	*p.*
118. From	132	2	1
ſubtract	53	5	3

	b.	*p.*	*g.*
119.	883	0	0
	84	3	1

	ch.	*b.*	*p.*
120.	105	14	2
	91	15	0

TIME.

	d.	*h.*	*m.*
121. From	73	4	37
ſubtract	45	10	41

	m.	*w.*	*d.*	*h.*
122.	47	1	3	13
	38	1	4	15

	m.	*w.*	*d.*
123. From	55	2	1
take	35	2	6

	w.	*d.*	*h.*	*m.*
124.	46	2	11	28
	6	5	16	37

QUESTIONS IN SUBTRACTION.

1. Required the difference between 305 and 97.

2. What is the difference between 1013 and 201?

3. What is the difference between 645300 and 64530?

4. How much is a thouſand leſs than a million?

5. How much does nine hundred millions exceed nine hundred thouſands?

6. There are two numbers, the greater of which is 73, and the leſſer, 26; what is their difference?

7. The greater of two numbers is 9001, and the ſum of both is 10110; required the leſſer.

8. What number added to ninety-nine thouſands will make one million?

9. The greater of two numbers is 3410, and their difference is 1019; what is the leſſer number, and the ſum of both?

10. Suppoſe my natal year to have been 1763; what will be my age in the year 1800?

11. How much is *James*, born in the year 1767, older than *Peter*, born in the year 1775?

12. The famous *Poliſh* aſtronomer, *Copernicus*, was born at *Thorn*, in the year 1473; how many years is it ſince, the queſtion being propoſed *anno Domini* 1787?

13. *Columbus*, a *Genoeſe*, diſcovered *America* in the year 1493; how many years is it ſince?

14. Required the number of years ſince the Conqueſt, it being in the year 1066.

15. How many years are elapſed ſince the battle of *Boſworth*, which was fought in the year 1485?

16. The battle of *Creſſy* happened in the year 1346; how many years is it ſince?

17. The preſſure of the air upon a human body, in fair weather, is about 33905 *lbs*; but in foul weather only 30624 *lbs*; what difference of weight does a human body ſuſtain in theſe extremities of weather?

18. Suppoſe that the great bell at *Pekin*, in *China*, weighs 120000 *lbs*; and the largeſt at *Maccleſfield* 2688 *lbs*; how many pounds is the latter inferior to the former?

19. The diſtance of *Mars* from the *Sun* is computed to be one hundred and twenty-five millions of miles; that of *Venus*, fifty-nine millions: when theſe

two planets are in conjunction, what is their diſtance from each other?

20. Required the diſtance between the *Sun* and *Moon*, in a ſolar eclipſe; the requiſite diſtances being given in a former queſtion.

21. The diameter of the *Earth* is 7970 miles, and the diameter of *Saturn*, 67000 miles: how much is the diameter of the former leſs than that of the latter?

22. The diameter of the *Sun* is 763000 miles, and the diameter of the *Moon*, 2180: how much does the former exceed the latter?

23. How many miles is the diameter of the *Earth* longer than that of the *Moon?*

24. Suppoſe I lent three hundred pounds, and have received in part thereof one hundred and ninety-one; what remains due?

25. I owe to *A*, 760*l.* but compound with him for 475*l*; I owe to *B*, 860*l.* but compound with him for 537*l*; I owe to *C*, 970 *l.* but compound with him for 606*l*; and to *D*, 1080*l.* but compound with him for 675*l.* What do I ſave by theſe compoſitions?

26. What is the difference between one hundred pounds, thirteen ſhillings, and three-pence; and ninety pounds, ſeventeen ſhillings, and eight-pence halfpenny?

27. Take fourteen ſhillings, and three farthings; from fifteen pounds, and five ſhillings.

28. From one pound, eleven ſhillings, and a halfpenny; take one pound, and eleven-pence three farthings.

29. From thirty-three pounds, ſubtract two pounds, and ſeven-pence farthing.

30. Subtract four pounds, and nine ſhillings; from fifteen pounds, and ſix-pence.

31. Suppoſe I borrowed ten thouſand pounds, and have paid in part thereof five thouſand and ninety pounds, nineteen ſhillings, and ſix-pence; how much remains unpaid?

32. To three hundred and one pounds, nineteen ſhillings, and ten-pence; add nineteen ſhillings, and

ſeven-pence, and from the ſum ſubtract twenty-three pounds, and eleven-pence.

33. Borrowed two thouſand, four hundred and ſixteen pounds, two ſhillings, and three farthings; and paid again eighteen hundred and fifty one pounds, ſeventeen ſhillings, and ten-pence three farthings: what remains unpaid?

34. Lent a perſon five thouſand pounds, of which he has repaid the following ſums, *viz.* four hundred pounds, thirteen ſhillings, and ſix-pence; twelve hundred pounds, and three-pence halfpenny; thirteen hundred and ten pounds, eight ſhillings, and three farthings; and nine hundred pounds, and fifteen ſhillings: what remains due to me?

35. A gentleman receives yearly rent, *viz.* from *A*, 243*l.* 16*s.* 9*d.* from *B*, 599*l.* 11*d.* from *C*, 777*l.* 17*s.* and from *D*, 678*l.* 1*s.* 7*d.* He allows annually for family expences, 500*l*; ſervants wages, and other domeſtic occurrences, 150*l.* 15*s*; to pay off tradeſmen's bills, 200*l.* 1*s.* 6*d*; and for pocket money, 71*l.* 17*s.* 9*d*: ſuppoſing theſe allocations juſt, how much can he put out at intereſt yearly?

36.

Edward Smith, Eſq.

To *Thomas Hall*, Dr.

1787.			*s.*	*d.*	*l.*	*s.*	*d.*
Jan. 3d,	15 *gal.* of red port,	at	9	0	6	15	0
14th,	10 *ditto*, palm ſack,	—	15	0	7	10	0
Mar. 4th,	9 *ditto*, *Liſbon*	—	10	0	4	10	0
21ſt,	7 *ditto*, *Rheniſh*,	—	10	6	3	13	6
April 5th,	½ cheſt *Florence*,	-	-	-	3	7	6
7th,	2 dozen claret,	—	78	0	7	16	0
					.	.	.
1787.							
March 3d,	By your bill on *Caldwell* and Co. received,				23	16	6
	Balance due,						

37. A gentleman left ſeventeen thouſand, one hundred and eleven pounds, to be divided between his ſon and daughter; the ſon was to have eleven thouſand, eleven hundred and eleven pounds: what was the daughter's fortune?

38. A factor received on his conſtituent's account, *viz.* from *A*, 725*l.* 14*s.* 1$\frac{1}{2}$*d*; and from *B*, 416*l.* 11*s.* 9$\frac{3}{4}$*d*: he paid to *C*, 12*l*; to *D*, 30*l.* 3$\frac{3}{4}$*d*; and to *E*, 999*l.* 11*s.* 11$\frac{1}{2}$*d*: how much ought he to remit to his conſtituent?

39. A trader failing was indebted, *viz.* to *A*, 1500*l.* 3*s.* 7*d*; to *B*, 1990*l.* 12*s.* 2$\frac{3}{4}$*d*; to *C*, 4011*l.* 0*s.* 5*d*; and to other inferior creditors, 806*l.* 7*s.* 10$\frac{1}{2}$*d*; his eſtate and effects amounted to 5332*l.* 11*s.* 10$\frac{1}{4}$*d.* What did the creditors loſe?

40. A goldſmith received 17*lbs.* 3 *oz.* 12 *dwts.* 16 *grs.* of ſilver, and melted down 12 *lbs.* 8 *oz.* 13 *dwts.* 19 *grs*; how much remains unmelted?

41. An ironmonger bought fifty-four tons of iron, out of which he ſold twenty tons, one hundred, and twelve pounds; how much remains unſold?

42. Bought an hogſhead of ſugar, containing 13 *C.* 3 *lbs*; out of which I ſold to *A*, 2 *C.* 17$\frac{1}{2}$ *lbs*; to *B*, 3 *C.* 1 *q.* 11 *lbs*; to *C*, 2 *C.* 3 *q.* $\frac{1}{2}$ *lb*; and to *D*, 2 *q.* 25 *lbs*: how much remains on hand?

43. A wine-merchant had in his cellars 173 tuns of wine; he bought from *A*, 92 *t.* 2 *hhd.* ſold to one perſon 58 *t.* 3 *hhd.* 58 *gal*; to another, 41 *t.* 31$\frac{1}{2}$ *gal.* and to a third, 50 *hhd.* 36 *gal*: he bought from *B*, 13 *t.* 42 *gal.* and retailed out 1000 gallons: how much has he on hand?

44. The gun-powder plot was diſcovered eighty-eight years after the reformation was begun, which was in the year 1517; king *Charles* I. was beheaded forty-three years after that diſcovery; in the year 1330 gun-powder was invented, being three hundred and thirty years before the return of *Charles* II. who had lived in exile ever ſince the death of his father *Charles* I: how long was that?

45. From the creation to the flood was 1656 years; thence to the building of *Solomon*'s temple 1336 years;

Troy was built 435 years before the temple, and 260 before *London*. Now, *Carthage* was built 113 years before *Rome*, which was founded 744 years before *Chriſt*, who was born *anno mundi* 4000: is *London* or *Carthage* the ancienter city, and how many years?

COMPOUND MULTIPLICATION.

When the multiplier is not greater than 12.

1. Write the multiplier under the loweſt denomination of the multiplicand.

2. Multiply every denomination of the multiplicand, beginning with the loweſt, by the multiplier, and carry to the product of the next ſuperior denomination, as in *Compound Addition*.

EXAMPLES *of* MONEY.

	l.	*s.*	*d.*		*l.*	*s.*	*d.*
1.	3	15	7	2.	2	11	8
			2				3

3.	5	4	9 × 4.	4.	5	0	3 × 5.
5.	8	16	4¼ × 6.	6.	6	5	6 × 7.
7.	4	13	2¾ × 8.	8.	4	15	5½ × 9.
9.	2	10	9 × 10.	10.	7	8	2½ × 11.
11.	9	15	11 × 12.	12.	1	4	3¾ × 2.
13.	17	11	0½ × 3.	14.	15	13	7 × 4.
15.	5	19	10¾ × 5.	16.	9	13	6½ × 6.
17.	3	11	5 × 7.	18.	18	2	11 × 8.
19.	12	0	5¼ × 9.	20.	13	9	5 × 10.
21.	14	19	9½ × 11.	22.	35	18	10¼ × 12.

When the multiplier is above 12, and a compoſite number.

Multiply continually by its component parts, uſing the greater number firſt, and the laſt product will be the anſwer.

	l.	s.	d.		l.	s.	d.
23.	49	1	6½ × 14.	24.	38	7	1¾ × 18.
25.	22	16	1½ × 21.	26.	26	6	4½ × 22.
27.	36	3	10¾ × 25.	28.	60	0	11½ × 28.
29.	95	19	2¾ × 30.	30.	3	18	8¾ × 33.
31.	6	12	9 × 36.	32.	51	14	9¼ × 42.
33.	84	11	10½ × 45.	34.	27	15	11 × 48.
35.	13	18	0¾ × 54.	36.	35	16	4¾ × 55.
37.	58	14	11¼ × 56.	38.	19	0	0¼ × 63.
39.	0	17	3¼ × 66.	40.	0	10	0¾ × 72.
41.	5	5	8¾ × 80.	42.	10	13	5½ × 81.
43.	0	15	2½ × 84.	44.	12	12	0¼ × 88.
45.	18	10	7 × 99.	46.	43	19	9¼ × 100.
47.	0	0	11½ × 108.	48.	3	13	0¼ × 110.
49.	7	9	5¾ × 132.	50.	492	8	10¼ × 144.

In the following examples, uſe three multipliers. The component parts, or multipliers, in the firſt example, are 7, 4, and 4.

51.	0	2	8 × 112.	52.	1	11	5 × 432.
53.	0	11	7¾ × 693.	54.	7	9	6 × 1584.

When the multiplier is greater than 12, *but leſs than* 24, *and not a compoſite number.*

Multiply by 12, and to the product add as many times the firſt line, as the given number exceeds 12.

55.	8	18	3½ × 13.	56.	2	7	6¼ × 17.
57.	20	2	9 × 19.	58.	1	17	4¾ × 23.

When the multiplier is greater than 24, *and not a compoſite number.*

Take two numbers whoſe product is the neareſt to the given number, and multiply as before. Then *add* or *ſubtract* as many times the firſt line as the product is *leſs* or *more* than the given number.

59.	0	8	0¾ × 34.	60.	71	5	0½ × 38.
61.	4	1	10¼ × 46.	62.	0	19	3¾ × 52.
63.	23	19	11½ × 68.	64.	53	4	5¼ × 69.
65.	109	4	6½ × 75.	66.	86	13	5¾ × 83.

	l.	*s.*	*d.*		*l.*	*s.*	*d.*
67.	4	19	1¼ × 94.	68.	1	1	9¾ × 103.
69.	55	8	11 × 106.	70.	67	0	10½ × 116.
71.	25	14	10¼ × 117.	72.	81	6	6¼ × 122.
73.	31	18	2¼ × 129.	74.	18	11	11¼ × 139.
75.	64	3	7¾ × 147.	76.	4	19	8¾ × 151.

When the multiplier is a mixed number.

Multiply by the integer, as in the preceding caſes, and for ½, add half the firſt line, for ¼, a fourth, and for ¾, add the parts of which it is compounded, namely, one half and a fourth.

77.	10	12	6 × 3½.	78.	6	16	2 × 5½.
79.	4	4	8 × 6¼.	80.	8	4	8 × 8¼.
81.	8	16	4 × 9¾.	82.	4	8	4 × 10¾.
83.	9	7	5 × 11¼.	84.	13	1	7 × 12¼.
85.	7	10	10½ × 15½.	86.	11	2	5½ × 16½.
87.	5	3	7 × 13¼.	88.	8	13	9 × 13½.
89.	13	15	0¾ × 17½.	90.	17	12	6 × 26¼.
91.	6	11	2 × 36¾.	92.	35	17	10 × 45¾.
93.	12	18	9¾ × 58½.	94.	2	5	11¼ × 62¼.
95.	0	6	11 × 76¾.	96.	0	19	7¼ × 120¼.
97.	0	10	6¾ × 69⅓.	98.	4	15	4 × 110⅜.

When the firſt figures of the multiplier make a compoſite number.

Multiply by its parts, and the laſt product multiplied by as many tens as there are ciphers after the compoſite number, will give the product required.

99.	0	2	3 × 150.	100.	0	6	2 × 240.
101.	0	0	7 × 4900.	102.	2	5	6 × 960½.
103.	1	9	2 × 530.	104.	0	1	5 × 365.

When the multiplier is a large number, conſiſting of hundreds, or thouſands.

For hundreds, multiply continually by 10 and 10, for thouſands, by 10, 10 and 10; then multiply the firſt line by the units in the multiplier, the ſecond, by the number of tens, the third, by the number of hundreds, &c. The ſum of theſe products will be the anſwer.

	l.	s.	d.		l.	s.	d.
105.	0	4	4½×300.	106.	5	1	2×1000.
107.	3	9	3×406.	108.	0	3	5×780.
109.	0	0	8¼×652.	110.	0	3	6¾×833.
111.	0	18	1×1115.	112.	0	12	11×6734¼.

Examples *of* Weights *and* Measures.

TROY-WEIGHT.

	lb.	oz.	dwts.			lb.	oz.	dwts.	gr.
113.	12	1	9×2.		114.	35	6	17	13×3.

	oz.	dwt.	gr.		lb.	oz.	dwts.	gr.
115.	84	3	7×4.	116.	23	4	6	20×5.

AVOIRDUPOIS.

	lb.	oz.	dr.		tuns,	C.	q.	lb.
117.	9	12	8×6.	118.	4	11	1	21×7.
119.	16	13	10×8.	120.	50	12	3	18×9.

APOTHECARIES.

	lb.	oz.	dr.	ſc.		lb.	oz.	dr.	ſc.	gr.
121.	7	4	6	2×10.	122.	26	0	2	1	5×11.

CLOTH-MEASURE.

	yds.	q.	n.		E.e.	q.	n.
123.	12	0	3×12.	124.	10	2	1×2.

	yds.	q.	n.		Fl.e.	q.	n.
125.	14	3	3×3.	126.	5	1	3×4.

LONG-MEASURE.

	yds.	f.	in.		L.	m.	fu.	p.
127.	47	2	9×5.	128.	11	1	4	27×8.
129.	40	1	2×9.	130.	8	0	7	30×11.

LAND-MEASURE.

ac. *r.* *p.* *ac.* *r.* *p.*
131. 98 2 14×15. 132. 8 2 5×24.
ac. *r.* *p.* *ac.* *r.* *p.*
133. 13 0 33×16. 134. 2 3 37×25.

WINE-MEASURE.

pipes, *h.* *g.* *tuns,* *h.* *g.* *q.*
135. 6 1 43×4. 136. 1 2 15 2×9.
pun. *g.* *q.* *tuns,* *h.* *g.* *p.*
137. 2 68 3×2. 138. 20 1 33 7×6.

ALE *and* BEER.

h.a. *f.* *g.* *h.b.* *g.* *p.*
139. 73 2 3×37. 140. 19 41 6×41.
h.b. *f.* *g.* *h.a.* *g.* *q.*
141. 200 3 4×34. 142. 90 45 1×53.

WINCHESTER.

b. *p.* *g.* *ch.* *b.* *p.*
143. 82 1 1×9. 144. 4 29 3×10.
p. *g.* *q.* *q.* *b.* *p.*
145. 25 0 3×6. 146. 18 6 1×7.

TIME.

h. *m.* *ſec.* *m.* *w.* *d.* *h.*
147. 9 54 36×7. 148. 10 2 0 21×11.
m. *w.* *d.* *d.* *h.* *m.* *ſec.*
149. 3 3 5×10. 150. 28 0 57 14×12.

QUESTIONS IN MULTIPLICATION.

1. Multiply 8575 by 7.
2. What is the product of 49187 and 6?

3. From 16021 take 5944, and multiply the remainder by 11.

4. Required the product of 79038 and 16.

5. Required the product of 7286 and 17.

6. Multiply 28 and 578 together.

7. Multiply 30079 by 40.

8. Required the product of 1937 and 112.

9. Multiply 20981 and 120 together.

10. Add 813 to 31257, from the ſum ſubtract 4020, and multiply the remainder by 800.

11. What is the product of 204893 and 730?

12. Subtract 1039 from 375317, and multiply the remainder by 516.

13. Multiply the difference between 310342 and 2774, by 540900.

14. To 713003 add 297, from the ſum ſubtract 5030, and multiply the remainder by 350.

15. The ſum of two numbers is 17264, and the greater number is 9999; what is their product?

16. Required the number of changes which may be rung upon 8 bells.

17. How many changes may be rung on 10 bells?

18. A certain iſland contains 37 counties, each county 26 pariſhes, each pariſh 42 families, and each family 12 perſons: required the number of pariſhes, families, and perſons in the whole iſland?

19. What is the ſquare of 217?

20. What is the cube of 8013?

21. Required the cube of 2400.

22. What is the difference between twice twenty-two, and twice two, and twenty?

23. Alſo between twelve times thirty-nine, and twelve times nine, and thirty?

24. How many different ways may two common dice, of ſix faces each, come up at one throw?

25. Multiply 5*l.* 13*s.* 3*d.* by 4.

26. Multiply 2*l.* 17*s.* 4*d.* by 15.

27. Multiply 3*l.* 8*s.* 2¼*d.* by 26.

28. Multiply 0*l.* 6*s.* 2¾*d.* by 9.

29. Multiply 34*l.* 11*s.* 4*d.* by 5¼.

30. Multiply 9*l.* 13*s.* 7½*d.* by 11½.

31. What will two yards of cloth coſt, at 6*s.* 10*d. per* yard?

32. What will 5 yards of broad cloth coſt, at 18*s.* 6*d. per* yard?

33. What will 6 ells of *Holland* coſt, at 7*s.* 2½*d. per* ell?

34. What coſt four pounds of tea, at 9*s.* 7*d. per lb?*

35. What coſt 3 yards of cambric, at 10*s.* 9*d. per* yard?

36. What coſt 8 pounds of ſugar, at 10¾*d per lb?*

37. From 9*l.* 11*s.* 0*d.* ſubtract 0*l.* 15*s.* 1½*d.* and multiply the remainder by 9.

38. To 4*l.* 19*s.* 7¼*d.* add 6*l.* 1*s.* 4½*d.* and multiply the ſum by 12.

39 What will half a yard of cloth coſt, at 10*s.* 5½*d. per* yard?

40. What will ¼ *lb.* of tea coſt, at 17*s.* 9*d. per lb?*

41. What will ¾ *yd.* of cloth come to, at 9*s.* 4*d. per* yard?

42. What coſt 9½ pounds of coffee, at 3*s.* 7*d. per lb?*

43. How many pounds ſterling are there in 10 purſes, each containing 10 guineas, 10 quarter guineas, and ten half crowns?

44. What coſt 11¼ *lbs.* of green tea, at 20*s.* 7*d. per lb?*

45. From the ſum of 11*l.* 4*s.* 3½*d.* and 212*l.* 0*s.* 3¾*d.* ſubtract 2*l.* 14*s.* 7*d.* and multiply the remainder by 6.

46. To the difference between 1000*l.* 6*s.* 0*d.* and 100*l.* 0*s.* 6*d.* add 5*l.* 10*s.* 2¼*d.* and multiply the ſum by 7.

47. What will 14 yards of *Iriſh* linen coſt, at 1*s.* 11¼*d. per* yard?

48. What coſt 16 dozen of candles, at 6*s.* 10¾*d. per* dozen?

49. What muſt be paid for 15 *cwt.* of cheeſe, at 35*s.* 9*d. per cwt?*

50. At 1*l.* 18*s.* 3½*d. per cwt.* what muſt be given for 20 *cwt?*

51. What coſt 21 tons of hay, at 5*l.* 6*s.* 8*d. per* ton?

52. What muſt be given for 17 reams of paper, at 9*s.* 6*d.* *per* ream?

53. What coſt 19 *lbs.* of butter, at 11¼*d.* *per lb?*

54. What coſt 23 *cwt.* of lead, at 17*s.* 2¼*d.* *per cwt?*

55. What muſt be paid for 25 dozen of flour, at 1*s.* 10¾*d.* per dozen?

56. What is the price of 26 barrels of beer, at 14*s.* 2*d.* *per* barrel?

57. What coſt 28 truſſes of hay, at 2*s.* 6½*d.* *per* truſs?

58. What will 24 weeks wages amount to, at 17*s.* 9½*d.* *per* week?

59. How many pounds ſterling are in 27 quarter guineas?

60. What coſt 28 ells of *Holland*, at 8*s.* 4¼*d.* *per* ell?

61. What coſt 32 pounds of tobacco, at 2*s.* 7*d.* *per* pound?

62. What is the price of 30½ yards of flannel, at 1*s.* 3¼*d.* *per* yard?

63. What muſt be paid for 34 yards of dowlas, at 1*s.* 8¼*d.* *per* yard?

64. What will 38 dozen of handkerchiefs coſt, at 14*s.* 9*d.* *per* dozen?

65. What muſt be paid for 33¼ ankers of rum, at 3*l.* 17*s.* 7*d.* *per* anker?

66. What will 35 pounds of gold amount to, at 46*l.* 14*s.* 6*d.* *per* pound?

67. What is the weight of 36 guineas, each 5 *dwts.* 9 *grs?*

68. What is the value of 42 pieces, each 3*l.* 12*s.* 0*d?*

69. How many pounds ſterling in 44 half guineas?

70. At 4*s.* 4*d.* *per* dollar, what is the value of 39 dollars?

71. What quantity of gold is requiſite to make 48 ſnuff-boxes, each to weigh 12 *dwts.* 14 *grs?*

72. What is the value of 44 bits, each 7½*d?*

73. What is the weight of 40 moidores, each 6 *dwts.* 22 *grs?*

74. What will 46 ounces of ſilver amount to, at 6*s.* 5½*d. per oz?*

75. What coſt 47 pieces of ivory, at 13*s.* 3½*d.* each?

76. What will 49¼ yards of ſhalloon coſt, at 1*s.* 11*d. per* yard?

77. What will 52 bibles come to, at 3*s.* 7*d.* each?

78. At 30*s.* 2*d. per* ton, what is the price of 50½ tons?

79. What coſt 53 dozen of port wine, at 1*l.* 5*s.* 9*d. per* dozen?

80. What will 58½ *lbs.* of pins come to, at 19½*d. per lb?*

81. What is the price of 56¾ yards of ſerge, at 3*s.* 3*d. per* yard?

82. Add 1*l.* 0*s.* 4½*d.* 0*l.* 8*s.* 7¼*d.* and 7*l.* 11*s.* 0¾*d.* together, from the ſum ſubtract 5*l.* 8*s.* 0½*d.* and multiply the remainder by 60¼.

83. What will be the carriage of 68¾ tons of goods, at 5*l.* 16*s.* 7*d. per* ton?

84. At 5¾*d. per* pound, what will be the price of 11 pounds?

85. From the ſum of 2*l.* 15*s.* 0¾*d.* 1*l.* 8*s.* 6¼*d.* and 3*l.* 18*s.* 10¾*d*, ſubtract 6*s.* 6¼*d.* and multiply the remainder by 63½.

86. What muſt be given for 75¾ gallons of oil, at 10*s.* 7*d. per* gallon?

87. What coſt 64 pounds of Caſtile ſoap, at 7*d. per* pound?

88. 1 *hhd.* of wine, at 11¼*d. per* quart.

89. What do 81 bags of hops weigh, each 2 *C.* 1 *q.* 23 *lbs?*

90. Required the price of 87¼ *cwt.* of hops, at 4*l.* 12*s.* 7*d. per cwt.*

91. Multiply the ſum of 10 *oz.* 11 *dwt.* 16 *gr.* and 8 *oz.* 7 *dwt.* 17 *gr.* by 12.

92. How many gallons of wine are in 94 caſks, each containing 31 *gal.* 2 *qts.* 1 *pt?*

93. What is the weight of 10 ingots of ſilver, each weighing 3*lb.* 7 *oz.* 15 *dwt.* 21 *gr?*

94. What will 85 gallons of rum coſt, at 11*s.* 0¾*d. per* gallon?

95. If 1 firkin of ſoap coſt 1*l.* 18*s.* 8*d.* what is the price of 121 firkins?

96. What is the price of 138 yards of broad cloth, at 19*s.* 10¼*d.* *per* yard?

97. What coſt 141 yards, at 17*s.* 8¾*d.* *per* yard?

98. 156 yards of cloth, at 15*s.* 10½*d.* *per* yard?

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99. What coſt 360 pair of ſhoes, at 3*s.* 0¾*d.* *per* pair?

100. What coſt 437 ounces of gold, at 3*l.* 15*s.* 4*d.* *per* ounce?

101. What is the value of 813 *ac.* 1 *r.* of land, at 37*l.* 14*s.* 5*d.* *per* acre?

102. What is the price of 5 *cwt.* of rice, at 2¾*d.* *per* pound?

103. What is the price of 11 *cwt.* of *ditto*, at the ſame rate?

104. If a man's daily expence be 1*s.* 8*d.* and he ſaves 30*l.* *per annum*: what is his yearly income?

105. A perſon ſtopping payment, owes to ſeveral 1000 pounds; but compounds with them for 12*s.* 6*d.* *per* pound; what muſt he pay them in all?

106. What is the amount of 200000 ſeſterces, reckoning a thouſand ſeſterces to be equal to 8*l.* 1*s.* 5½*d.* of our money?

BILLS *of* PARCELS.

107. *Mancheſter*, *April* 8, 1787.

Miſs *Porter*,

Bought of *Cha. Hindley.*

			s.	*d.*		
4	yards of ſilk,	- at	13	3	*per yd.*	. . .
7	——— ſatin,	- —	10	11	—	. . .
3	——— brocaded *ditto*,	—	17	0	—	. . .
12	——— luſtring,	—	6	1	—	. . .
5	——— velvet,	- —	18	7	—	. . .
11	——— flowered ſilk,	—	15	6	—	. . .

Required the amount.

108.

108. *Macclesfield*, *June* 19, 1787.

Mr. *John Stone*,

Bought of *J. Swanwick*.

			l.	s.	d.		
10	dozen of ſilk ſtockings,	at	5	19	1¼	*p.do.*	. . . .
6	——— thread *ditto*,	—	2	6	7	—	. . .
1	——— cotton,	—	0	4	3	*per p.*	. . .
7	pair of worſted,	—	0	5	6	—	. . .
4	——— black ſilk,	—	0	9	7	—	. . .
11	——— men's gloves,	—	0	1	11	—	. . .

109. *Mancheſter*, *Aug.* 1, 1787.

Mr. *Gunſon*,

Bought of *Timothy Sharpe*.

			s.	d.		
6	gallons of rum, -	at	10	3	*per gal.*	. . .
8½	——— *B.* brandy,	—	17	7		. . .
14	——— ſhrub,	—	8	6¾		. . .
26	dozen of port, -	—	26	5	*per doz.*	. . .
35	gallons of mountain,	—	9	8	— *gal.*	. . .
53¾	——— *Burton* ale,	—	1	9		. . .

110. *Mancheſter*, *April* 12, 1787.

Mr. *Rodney*,

Bought of *Tho. Hammond*.

				d.		
3 legs of mutton,	*wt.*	26*lbs.*	at	4¼	*per lb.*	. . .
A ſaddle of *ditto*,	—	12	—	4½	—	. . .
Rump ſteaks,	—	19¾	—	6	—	. . .
2 hams, -	—	38	—	3½	—	. . .
A loin of veal,	—	17½	—	4¾	—	. . .
A quarter of lamb,	—	11¼	—	15	—	. . .

111. *Lancaſter*, 1787.

Mr. *C. Dod*,

Bought of *Sept. Furneſs*.

		d.	
Aug. 12th,	4 ſugar loaves, *wt.* 62½ *lbs.*	at 11 *p. lb.*	. . .
23d,	39 *lbs.* of raiſins,	— 6½	. . .
Sept. 1ſt,	10 — cloves,	— 9½ *p. oz.*	. . .
4th,	7¼ — pepper,	— 22 *p. lb.*	. . .
		s. d.	
11th,	1¾ — green tea,	— 15 7	. . .
Oct. 5th,	3 *C.* 1 *q.* 8 *lbs.* of currants,	— 7¾	. . .

112. *Cheſter*, *Jan.* 1, 1787.

Mr. *M. Tucker*,

Bought of *Starkey Broadhurſt*.

		s.	d.	
Barley, 6 *qrs.*	at	17	9 *per qr.*	. . .
Wheat, 4 *qrs.* 4 *buſh.*	—	25	5	. . .
Peas, 31 buſhels,	—	3	2½ *per bu.*	. . .
Beans, 15 buſhels, 3 pecks,	—	4	7	. . .
Rye, 3 quarters, 5 buſhels,	—	19	6 *per qu.*	. . .
Oats, 58 *qrs.* 7 *buſh.*	—	10	9	. . .

COMPOUND DIVISION.

To divide by any number not exceeding 12.

Divide the higheſt denomination by the given number, reduce the remainder to the next inferior name, taking in the number which ſtands in that place, and divide by the given number as before. Proceed, in the ſame manner, through all the denominations, to the loweſt.

EXAMPLES *of* MONEY.

		l.	s.	d.			l.	s.	d.
1.	2 |	6	10	4	2.	3 |	9	10	3

	l.	s.	d.			l.	s.	d.	
3.	5	8	8	÷4.	4.	7	3	9	÷5.
5.	10	5	3	÷6.	6.	29	16	9	÷7.
7.	29	4	10	÷8.	8.	59	18	3¾	÷9.
9.	14	16	11¼	÷10.	10.	58	6	5½	÷11.
11.	92	5	0	÷12.	12.	2	17	3½	÷2.
13.	40	1	5½	÷3.	14.	45	17	5	÷4.
15.	48	17	9¾	÷5.	16.	83	6	2¼	÷6.
17.	69	5	6¼	÷7.	18.	164	19	6	÷8.
19.	122	10	9	÷9.	20.	170	6	5½	÷10.
21.	162	5	5	÷11.	22.	526	0	0¼	÷12.

When the diviſor is a compoſite number.

Divide continually by its component parts, as in SIMPLE DIVISION, and the laſt quotient will be the anſwer.

	l.	s.	d.			l.	s.	d.	
23.	107	17	6	÷15.	24.	260	2	0	÷16.
25.	59	11	8¾	÷18.	26.	280	4	9¾	÷20.
27.	895	5	6	÷24.	28.	1202	6	6	÷21.
29.	20	19	4¼	÷27.	30.	10	18	8	÷33.
31.	97	10	0¾	÷32.	32.	1	5	6¼	÷35.
33.	3089	0	4½	÷42.	34.	79	6	6½	÷44.
35.	27	7	8½	÷45.	36.	187	1	7	÷49.
37.	3489	18	11½	÷50.	38.	386	4	3	÷54.
39.	22	0	10¾	÷56.	40.	25	13	5¼	÷64.
41.	72	9	10½	÷66.	42.	828	3	5¾	÷72.
43.	0	5	3	÷77.	44.	935	14	6¼	÷81.
45.	188	7	0	÷84.	46.	5	17	1	÷90.
47.	95	5	9¼	÷96.	48.	10041	7	3½	÷100.
49.	826	5	2¾	÷108.	50.	551	16	9¾	÷110.
51.	39	3	8½	÷121.	52.	574	19	0	÷144.

In the following examples it will be neceſſary to uſe three diviſors. When there are three remainders, multiply the laſt remainder by the ſecond diviſor, and to the product add the ſecond remainder; then multiply the ſum by the firſt diviſor, to the product add the firſt remainder, and the ſum will be the whole remainder.

	l.	*s.*	*d.*			*l.*	*s.*	*d.*	
53.	14	1	3	÷150.	54.	79	4	11	÷330.
55.	4	1	4½	÷126.	56.	4	14	7	÷616.

When the diviſor is greater than 12, and not a compoſite number.

Find the ſeveral quotients by LONG DIVISION.

	l.	*s.*	*d.*			*l.*	*s.*	*d.*	
57.	41	5	11	÷17.	58.	76	7	7	÷23.
59.	169	14	6	÷31.	60.	332	2	8	÷47.
61.	253	2	11	÷58.	62.	386	15	9½	÷62.
63.	983	5	8½	÷75.	64.	764	4	8½	÷86.
65.	173	12	9¼	÷94.	66.	2523	9	1¾	÷98.
67.	81	0	10	÷109.	68.	1000	0	0	÷137.
69.	2136	19	1	÷164.	70.	100101	9	6¼	÷183.
71.	22083	7	0	÷215.	72.	12162	12	11¾	÷406.
73.	32860	4	4	÷784.	74.	361072	2	3	÷1012.

To divide a compound number, conſiſting of pounds, ſhillings, &c. by 100.

Cut off, by a perpendicular line, the two right hand places of the pounds; multiply the figures which are cut off, by 20, and write the firſt two figures of the product on the right of the line, ſetting down the reſt of the product on the left, for ſhillings. Multiply the laſt figures cut off, by 12, placing the product as before, for pence; then multiply by 4, for farthings, and the numbers on the left of the perpendicular line will expreſs the quotient required.

	l.	s.	d.			l.	s.	d.	
75.	877	1	8	÷100.	76.	1352	16	3	÷100.
77.	9706	10	7¼	÷100.	78.	250	4	7¾	÷100.

When the learner underſtands COMPOUND DIVISION, and is pretty ready in the practical part, he may perform the following examples in one line, as ſuch frequently occur in the higher rules of arithmetic.

	l.	s.	d.			l.	s.	d.	
79.	93	17	6	÷30.	80.	1139	15	10	÷20.
81.	413	15	0	÷60.	82.	362	5	0	÷80.
83.	155	19	0¼	÷20.	84.	1200	7	8	÷40.
85.	1581	12	6	÷120.	86.	572	0	0	÷25.

87. 617 16 9¼÷25.

EXAMPLES *of* WEIGHTS *and* MEASURES.

TROY-WEIGHT.

	lb.	oz.	dwts.				lb.	oz.	dwts.	gr.	
88.	30	8	14		÷2.	89.	16	9	11	8	÷3.
	oz.	*dwts.*	*gr.*				*lb.*	*oz.*	*dwts.*	*gr.*	
90.	15	13	16		÷4.	91.	52	3	9	15	÷5.

AVOIRDUPOIS.

	C.	q.	lb.			T.	C.	q.	lb.	
92.	71	2	7	÷6.	93.	46	12	1	21	÷7.
	lb.	*oz.*	*dr.*			*T.*	*C.*	*q.*	*lb.*	
94.	70	2	8	÷8.	95.	457	15	0	8	÷9.

APOTHECARIES.

	lb.	oz.	dr.			lb.	oz.	dr.	ſc.	gr.	
96.	8	11	4	÷10.	97.	19	8	7	0	14	÷11.

CLOTH-MEASURE.

yds. q. n. *E.e. q. n.*
98. 50 1 0÷12. 99. 38 3 1÷3.
yds. q. n. *Fl.e. q. n.*
100. 330 3 0÷4. 101. 56 1 3÷5.

LONG-MEASURE.

m. f. p. *y. f. in.*
102. 287 6 31÷7. 103. 636 1 1÷8.
y. f. in. *L. m. f. po.*
104. 123 1 6÷18. 105. 71 0 4 9÷22.

LAND-MEASURE.

ac. r. p. *ac. r. p.*
106. 22 2 13÷36. 107. 350 3 35÷55.
ac. r. p. *ac. r. p.*
108. 44 3 13÷9. 109. 199 1 0÷11.

WINE-MEASURE.

hhd. g. q. *tuns, hhd. g.*
110. 299 17 3÷53. 111. 476 3 40÷12.
tuns, hhd. g. *hhd. g. pts.*
112. 266 3 54÷78. 113. 179 30 2÷2.

ALE *and* BEER.

b.a. f. g. *hhd.b. g. q.*
114. 191 3 5÷3. 115. 155 49 0÷4.
b.b. f. g. *h.a. g. p.*
116. 1564 0 3÷5. 117. 328 16 4÷6.

WINCHESTER-MEASURE.

q. b. p. *ch. b. p.*
118. 62 2 3÷7. 119. 159 1 3÷8.
q. b. p. *ch. b. p.*
120. 89 1 3÷9. 121. 8 24 2÷10.

TIME.

d. h. m. *m. w. d. h.*
122. 3602 0 30÷94. 123. 56 3 4 15÷11.
d. h. m. *m. w. d. h.*
124. 138 2 28÷166. 125. 210 1 2 12÷12.

QUESTIONS IN DIVISION.

1. Divide 37815 by 5.

2. Divide 146376 by 8.

3. What is the quotient of 50298, divided by 12?

4. Multiply 295365 by 20, and divide the product by 21.

5. Required the quotient of 1079086 by 38.

6. Divide 208157 by 32.

7. Divide 86092 by 530.

8. How oft is 60 contained in 5340?

9. What is the 33d part of 19239?

10. Required the difference between the 72d and 73d parts of 68328.

11. Add 29613 to 672039, and divide the ſum by 12.

12. What number, multiplied by one hundred, will produce 32000?

13. A certain field produced 10089 cabbages, weighing all together 146921 *lb.* 1 *oz.*; what was the average weight of one cabbage?

14. A ſhip bound to *Port Royal*, *Jamaica*, took her departure from the *Lizard* on a certain day, and in 6 weeks completed her voyage; the diſtance being 3972 miles, what was her rate of ſailing *per* day?

15. The product of two numbers is 4278, and the greater number is 93: what is the difference between the ſum of their cubes and the cube of their ſum?

16. Divide 34*l.* 6*s.* 6*d.* by 6.

17. Divide 13*l.* 3*s.* 6½*d.* by 11.

18. Divide 43*l.* 13*s.* 7¼*d.* by 19.

19. Divide 57*l.* 15*s.* 11¼*d.* by 15.

20. Divide 46213 pounds ſterling by 112.

21. Multiply 30766 ſhillings by 1027, and divide the product by 523.

22. If 20000 pounds were equally diſtributed amongſt 1106 men, what would each man receive?

23. If 7 yards of broad cloth coſt 6*l.* 3*s.* 8*d.* how much is it *per* yard?

24. If 3 yards of cloth coſt 1*l.* 2*s.* 3*d.* what will 1 yard coſt?

25. What is the price of one pound of ſugar, when 5 pounds coſt 4*s.* 9½*d?*

26. If 9 pounds of coffee be ſold for 1*l.* 15*s.* 1½*d.* what is it *per* pound?

27. What is rum *per* gallon, if 6 gallons coſt 3*l.* 19*s.* 6*d?*

28. Add 3*l.* 11*s.* 2*d.* 6*l.* 0*s.* 6½*d.* and 1*l.* 13*s.* 3*d.* together, multiply the ſum by 4, and divide the product by 7.

29. Multiply 109*l.* 15*s.* 4¼*d* by 15, from the product ſubtract 164*l.* 6*s.* 0¼*d.* divide the remainder by 12, and to the quotient add 26*l.* 9*s.* 7¾*d.* how much does the ſum exceed 100 guineas?

30. The expences of a country feaſt, amounting to 142*l.* 14*s.* 1½*d.* were to be defrayed by 6 ſtewards, what was each to pay?

31. What is the price of 1 yard of cambric, whereof 11 yards coſt 3*l.* 18*s.* 10*d?*

32. Bought 4 gallons of wine for 19*s.* 6*d.* at what was it charged *per* gallon?

33. Divide a guinea equally amongſt 8 boys.

34. A dozen perſons at a tavern ſpent 18*l.* 19*s.* 3*d*; how much was the ſhare of each?

35. Divide 200*l.* between two men, and give the one 73*l.* more than the other.

36. *A*, *B*, and *C* owe me each a ſum of money; *A*'s and *B*'s together amount to 47*l.* 4*s.* 7*d*; *A*'s and *C*'s, to 71*l.* 7*s.* 1*d*; and *B*'s and *C*'s, to 88*l.* 8*s.* 8*d* required the debt of each perſon ſeparately.

37. If 15 yards of ſilk coſt 11*l.* 8*s.* 9*d.* what will 1 yard coſt?

38. Required the price of 1 ell of *Holland*, 24 ells being ſold for 8*l.* 19*s.* 6*d.*

39. Bought 14 tons of hay for 68*l.* 1*s.* 6*d.* what did it coſt *per* ton?

40. Required the price of 2 ounces of tea, at 6*s.* 0*d. per* pound.

41. What will 1 *cwt.* of hops coſt, at the rate of 41*l.* 10*s.* 6*d.* for 13 *cwt?*

42. A draper bought 19 yards of broad cloth for 15*l.* 13*s.* 4*d.* at what rate muſt it be ſold *per* yard, to gain 2*l.* by the whole?

43. If 25 fother of lead coſt 16*l.* 15*s.* 0*d.* what is it per fother?

44. Gave 58*l.* 13*s.* 0*d.* for 36 hundred of cheeſe; what did it coſt *per cwt?*

45. What is the value of 1 ell of *Holland*, 33 ells being worth 12*l.* 4*s.* 9*d?*

46. If an hogſhead of brandy coſt 30*l.* 19*s.* 6*d.* what is it *per* gallon?

47. What are candles *per lb.* at 2*l.* 2*s.* 3½*d.* for 70 pounds?

48. What is rum *per* gallon, of which 42 ankers are ſold for 199*l.* 10*s.* 0*d?*

49. What is dowlas *per* yard, if 49 yards coſt 3*l.* 11*s.* 5½*d?*

50. A pound weight of ſtandard ſilver bullion being coined into 62 ſhillings; what is the weight of one ſhilling?

51. Bought 12 dozen of handkerchiefs for nine guineas, at what muſt I ſell them a-piece, to gain one guinea in the ſale of the whole?

5[illegible] A cubic foot of water weighs 76 pounds troy, and air is 860 times lighter than water; required the weight of a cubic foot of air.

53. What is the fourth part of 9 *yds.* 2 *f.* 2 *in?*

54. Bought 4½ ounces of ſilver for 1*l.* 8*s.* 8¼*d.* what is the price of 1 ounce?

55. Gave 3*l.* 17*s.* 7¼*d.* for 6¼ yards of muſlin, what is the price *per* yard?

56. If 3½ dozen, or 42 bottles, of port wine be ſold for 4*l.* 16*s.* 3*d.* what is it *per* bottle?

57. A pound weight of ſtandard gold bullion being coined into $44\frac{1}{2}$ guineas; required the full weight of one guinea.

58. Bought $39\frac{1}{4}$ yards of cloth for 29*l.* 15*s.* $3\frac{1}{2}$*d.* what did it coſt *per* yard?

59. What is ſerge *per* yard, if 43 yards coſt 7*l.* 7*s.* $9\frac{3}{4}$*d?*

60. If 1 *cwt.* of hops coſt 4*l.* 15*s.* 8*d.* how much are they *per* pound?

61. Bought 8 *cwt.* of currants for 30*l.* 16*s.* 0*d.* what did they coſt *per lb?*

62. Bought 50 cheſts of oranges, each containing 1000, for 260*l.* 8*s.* 4*d*; what was the price of each orange?

63. What is the value of 1 *lb.* of tea, if 63 cheſts, each weighing neat 93 *lbs.* coſt 3106*l.* 9*s.* $9\frac{3}{4}$*d?*

64. If half a dozen tea-ſpoons weigh 4 *oz.* 18 *dwts.* 18 *gr.* what does each ſpoon weigh?

65. If 42 loaves of ſugar, of equal weight, weigh 8 *C.* 3 *q.* 7 *lb.* what is the weight of one loaf?

66. If 10 pieces of linen contain 238 *yds.* 0 *q.* 2 *n.* what is the length of each piece?

67. If 7 pounds of ſilver coſt 21 guineas, what is the price of 1 ounce?

68. If a gentleman's yearly income be 10000 pounds, how much is it *per* day?

69. A perſon failing in trade, owes in all 977 pounds, and has in money, goods, and recoverable debts, 420*l.* 6*s.* $3\frac{1}{4}$*d.* ſuppoſing theſe things delivered to his creditors, what will they receive *per* pound?

70. A trader cleared 14357*l.* 16*s.* 6*d.* in 19 years, what was his gain *per* annum?

71. Divide 332*l.* 14*s.* $9\frac{3}{4}$*d.* amongſt 6 men, and 9 women; each man to have twice as much as each woman.

72. Divide 1000 guineas and 100 farthings among 20 men, 30 women, and 40 boys; the men to have reſpectively as much as three women, and each woman as much as 9 boys.

QUESTIONS IN REDUCTION.

1. In 128 pounds, how many ſhillings, and pence?
2. In 350 pounds, how many farthings?
3. How many ſhillings, and pounds are in 11040 pence?
4. In 73*l.* 4*s.* 9¾*d.* how many farthings?
5. Reduce 20*l.* 15*s.* 10*d.* to farthings.
6. How many pounds are in 46515 farthings?
7. In 5010*l.* 10*s.* 0¾*d.* how many farthings?
8. In 219124 pence, how many pounds?
9. In 58130 farthings, how many pounds?
10. Reduce 4087*l.* 13*s.* 11½*d.* to ſhillings, pence, and halfpence.
11. Reduce 25*l.* 3*s.* 6*d.* to ſhillings, and ſixpences.
12. How many pence, ſhillings, and pounds are there in 25813 halfpence?
13. In 172*l.* 8*s.* 8*d.* how many four-pences?
14. How many ſhillings, and pounds are in 12229 ſix-pences?
15. How many pounds are in 7830 three-pences?
16. Reduce 210*l.* 0*s.* 2*d.* to two-pences.
17. Reduce 957*l.* 16*s.* 9*d.* to three-pences.
18. In 465 guineas, how many pence?
19. In 621 crowns, how many ſhillings, and pence?
20. Reduce 43*l.* 12*s.* to two-ſhillings.
21. In 1460*l.* 8*s.* how many two-ſhillings?
22. How many pounds are in 5707 two-ſhillings?
23. In 29040 farthings, how many pence, ſhillings, crowns, and pounds?
24. How many half-crowns, and pence are in 1730 pounds?
25. How many guineas are in 46872 pence?
26. In 21 eight-pences, how many ſhillings?
27. In 19 eight-pences, how many ſhillings?
28. How many ſhillings are in 26 eight-pences?
29. How many pounds are in 401 eight-pences?
30. In 15600 pence, how many ſix-pences, half-crowns, crowns, and pounds?

31. In 39*l.* 16*s.* 2$\frac{3}{8}$*d.* how many eighths of a penny?

32. Reduce 43*l.* 17*s.* 0$\frac{5}{8}$*d.* to eighths.

33. How many pence, ſhillings, and pounds are in 202784 eighths of a penny?

34. In 11 marks how many pence?

35. Reduce 230 moidores to ſhillings, and pounds.

36. Reduce 3182 guineas to pounds.

37. How many ſhillings, and guineas are in 546 crowns?

38. How many ſix-pences, and pounds are in 3840 ſhillings?

39. Reduce 55*l.* 16*s.* 2*d.* to the loweſt name mentioned.

40. Reduce 7*s.* 8$\frac{1}{4}$*d.* to the loweſt name.

41. Reduce 73*l.* 13*s.* 5*d.* and 5*l.* 19*s.* to the ſame denomination.

42. Reduce 19*l.* 11*s.* 6*d.* and 4*l.* 1*s.* 3*d.* to the ſame denomination.

43. Reduce 7021*l.* 0*s.* 4*d.* and 913*l.* 12*s.* 8*d.* to the ſame denomination.

44. Reduce 465*l.* 10*s.* and 71*l.* 15*s.* to the ſame denomination.

45. Reduce 581*l.* 6*s.* and 37*l.* 16*s.* to the ſame denomination.

46. Reduce 6*s.* 9$\frac{1}{2}$*d.* and 500*l.* to the ſame denomination.

47. How many half-guineas are there in 194*l.* 10*s?*

48. With how many guineas can a merchant pay 346*l.* 10*s.*

49. How many quarter guineas are equal to 35*l.* 11*s.* 9*d?*

50. How many half-crowns are in 8573*l.* 14*s.* 6*d?*

51. How many dollars, each 4*s.* 4*d.* are in 239*l.* 17*s?*

52. How many *French* crowns, exchange at 52$\frac{1}{2}$*d.* *per* crown, are equal to 514*l.* 2*s.* 11*d?*

53. In 451*l.* 11*s.* 3*d.* how many *French* crowns, at 53$\frac{1}{8}$*d.* *per* crown?

54. How many crowns, half-crowns, and ſhillings, and of each the ſame number, are in 48*l.* 9*s.* 0*d?*

55. How many guineas, half-guineas, and quarter-guineas, and of each the ſame number, are in 14720*l.* 4*s.* 3*d?*

56. In 10288 pence, how many half-crowns, ſhillings, ſix-pences, and groats, and of each an equal number?

57. How many half-guineas, crowns, and half-crowns, and an equal number of each, are contained in 2017*l.* 14*s?*

58. How many half-crowns are equal to 130 quarter-guineas?

59. In 558 three-and-four-pences, how many crowns?

60. How many dollars, at 4*s.* 1*d.* each, are equal in value to 243 *French* crowns, at 4*s.* 6*d.* *per* crown?

61. In 328 piſtoles, each 17*s.* how many guineas?

62. How many guineas are 1000000 of *Spaniſh* dollars worth, at 4*s.* 4*d.* *per* dollar?

63. How many millrees, at 6*s.* 5½*d.* each, are equivalent to 3100 rix-dollars, at 4*s.* 10⅝*d.* *per* rix-dollar?

64. How many pounds ſterling are in 250000 cruſades, each 400 rees, at 6*s.* 6*d.* *per* millree, or 1000 rees?

65. How many ounces, penny-weights, and grains are in 113 pounds of gold?

66. In 344870 grains, how many penny-weights, ounces, and pounds?

67. Reduce 22 *lbs.* 7 *oz.* 10 *grs.* to grains.

68. In 47376 grains, how many pounds?

69. Reduce 83 *lbs.* 13 *dwts.* to the loweſt name mentioned.

70. Reduce 5 *lbs.* 11½ oz. and 619 *lbs.* 3 *oz.* to the ſame denomination.

71. In 10 ingots of ſilver, each 3 *lb.* 8½ *oz.* how many pounds, and ounces?

72. How many grains are in 357 ingots, each 6 *lb.* 12 *dwt.* 21 *gr?*

73. How many ſpoons, each to weigh $2\frac{1}{4}$ ounces, may be made out of 8070 ounces of ſilver?

74. A quantity of *Spaniſh* ſilver in bars weighs 29710 *lb.* 10 *oz.* what is the number of bars, each weighing 2 *lb.* 11 *oz.* 6 *dwt?*

75. How many penny-weights of ſilver are in three tankards, each weighing 21 *lb.* 10 *dwt*; three punch bowls, each weighing 2 *lb.* 5 *oz.* 4 *dwt*; and three ladles, each 4 *oz.* 18 *dwt?*

76. A gentleman ſent his ſilverſmith 1000 *oz.* of old plate, with orders to make it into the following articles, *viz.* tankards, each to weigh 19 *oz.* 16 *dwt.* 11 *gr*; punch bowls, each 23 *oz.* 18 *dwt*; cups, each 7 *oz.* 20 *gr*; plates, each 11 *oz.* 6 *dwt.* 12 *gr*; ſpoons, each 2 *oz.* 12 *dwt.* 13 *gr*; and ſalts, each 1 *oz.* 19 *dwt*; and the number of each article the ſame: how many of each muſt the ſilverſmith make?

77. How many hundreds, quarters, and pounds are in 3461 tons of iron?

78. Reduce 3 *C.* 14 *lb.* 9 *dr.* to drams.

79. In 471671 ounces of copper, how many *cwt?*

80. In 40 *T.* 3 *C.* 3 *q.* 25 *lb.* 10 *oz.* 7 *dr.* how many drams?

81. How many tons are in 15420 *lbs.* of bread?

*82. Reduce 57 *cwt.* to pounds.

*83. Reduce 19 *C.* 1 *q.* 8 *lb.* to pounds.

*84. In 536 *C.* 3 *q.* 11 *lb.* how many pounds?

*85. How many pounds are in 7 *C.* 19 *lb?*

86. How many great pounds are in 2337 common pounds?

87. Reduce 265 great pounds to common pounds.

88. In 73 fother of lead, how many *cwt?*

89. How many fother are in 390 *cwt?*

90. Out of 13 *C.* 1 *q.* 12 *lb.* of tea, how many caniſters may be filled, each to hold 11 *lb?*

91. What is the weight of 53 pieces of lead, each 2 *C.* 2 *q.* 13 *lb?*

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* An explanation of a compendious way of working theſe examples may be found in DEAN'S RULE OF PRACTICE, *Pa.* 160.

92. In 90300 *lbs.* of ſugar, how many *hhds.* each to weigh 10¾ *cwt?*

93. How many parcels, each to weigh 17½ *lb.* are in 6 caſks of raiſins, each weighing 2 *C.* 3 *q.* 14 *lb?*

94. In 548¼ *cwt.* of indigo, how many caſks of 2¼ *cwt.* 3¾ *cwt.* and 4¾ *cwt:* and of each the ſame number?

95. In 1378 bags of tea, each 13 *lb.* 13 *oz.* how many *cwt?*

96. How many doſes, each 16 grains, are in a medicine weighing 3 *lb.* 5 *oz.* 1 *ſc.* 12 *gr?*

97. How many pounds are in 80830 grains?

98. In 73 *yds.* 3 *n.* of cloth how many nails?

99. Reduce 3308 nails to quarters, and *Engliſh* ells.

100. How many *Flemiſh* ells are in 9871 nails?

101. In 58239 *French* ells, how many *Engliſh* ells?

102. In 35878 quarters of *Holland*, how many pieces, each to contain 13¾ yards?

103. How many yards are 5432 *Eng.* ells equal to?

104. In 24 pieces, each 31 *Flemiſh* ells, how many *French* ells?

105. In 69 bales of cloth, each containing 31 pieces, each 28 *Flemiſh* ells, how many yards?

106. How many furlongs, poles, yards, feet, inches, and barley-corns are in 1 mile?

107. How many feet, yards, poles, furlongs, miles, and leagues are in 2851200 inches?

108. How many leagues, miles, *&c.* are contained in 100880 feet?

109. Reduce 23 *p.* 2 *y.* 1 *f.* 8 *in.* to inches.

110. How many inches are between *London* and *Macclesfield*, the diſtance being 167 miles?

111. At how many ſteps of 2 *f.* 8 *in.* each can a perſon go from *Macclesfield* to *Preſtbury*, the diſtance being 2¼ miles?

112. How many times does a wheel, which is 5 *y.* 1 *f.* 7 *in.* in circumference, go round between *London* and *Edinburgh*, being 386 miles?

113. In 34 degrees, how many geographical miles?

114. How many ſtatute miles are in 58 degrees?

115. How many geographical miles are between *London* and *Pekin* in *China*, the diſtance being 72½ degrees?

116. How many barley corns are equal to the circumference of the earth, or 360 degrees?

117. In 28509 ſquare poles, how many acres?

118. How many ſhares, of 999 poles each, are in a paſture containing 493 *a.* 1 *r.* 1 *p?*

119. Suppoſe a field, whoſe content is 56 *a.* 2 *r.* 29 *p.* 17 *y.* is to be divided between two perſons, *A* and *B*; *A* to have 38 *a.* 3 *r.* 13 *p.* 25 *y.* and *B* the remainder: required the number of yards in *B*'s ſhare?

120. How many feet and inches are in 7.7238 ſquare yards?

121. How many cubic inches are equal to the ſolidity of the earth, or 144 514 892 946 615 009 280 cubic yards?

122. Reduce 40 *hhds.* 50 *g.* 3 *p.* of wine to pints.

123. In 13398 gallons of Canary, how many hogſheads and tuns?

124. In 33 vats of rheniſh, each containing 257 gallons, how many tierces?

125. In 13 tuns of oil, how many pints?

126. In 30 butts of wine, how many quarts, pints, and half-pints, and of each an equal number?

127. Admit a ſhip's cargo from the *Canaries*, to be 300 pipes, 210 hogſheads, and 180 barrels, what is the weight of the whole, ſuppoſing each gallon to weigh 8¼ *lbs.* avoirdupois?

128. In 1000 *b.* 3 *f.* 6 *g.* of ale, how many gallons, and quarts?

129. In 202 *hhds.* 49 *g.* 7 *p.* of beer, how many pints?

130. How many *hhds.* are in 70013 pints of ale?

131. How many barrels are in 266870 quarts of beer?

132. How many tuns are in 8676 pints of beer?

133. In 24 *hhds.* of beer, how many barrels?

134. In 771 barrels of beer, how many *hhds*?

135. How many barrels are in 37 *hhds*. of ale?

136. In 5149 firkins of ale, how many hogſheads, beer meaſure?

137. Reduce 82 *q*. 3 *b*. 1 *g*. of corn to gallons.

138. In 12322 pecks of barley, how many quarters?

139. How many gallons are in 71 *l*. 7 *q*. 3 *p*. 1 *g*. of oats?

140. In 66 buſhels of ſalt, how many pints?

141. How many chaldron of coals are in 7560 ſacks, each 3 *b*. 3 *p*?

142. How many minutes are in 233 *d*. 11 *h*. 20 *m*?

143. Reduce 150000000 thirds to months.

144. In three centuries, how many hours?

145. Since the birth of our *Saviour* to *Chriſtmas* 1788, how many days?

146. From the 19th of *Dec*. 1787, to Midſummer-day, *June* 24th, following, both incluſive, how many weeks?

RULE-OF-THREE *Direct.*

IN the ſingle RULE-OF-THREE there are three numbers given, to find a fourth: two of which contain a *ſuppoſition*; and the third, a *demand*. If *more* require *more*, or *leſs* require *leſs*, the proportion is called *direct*.

To STATE *the* QUESTION.

Place the term of ſuppoſition which is of the ſame name with the required term in the middle, and the other term of ſuppoſition in the firſt place. Write the remaining number in the third place.

To WORK *the* QUESTION.

Reduce the firſt and third terms to the ſame denomination, and the ſecond to the loweſt name mentioned.

tioned. Multiply the ſecond and third terms together, and divide the product by the firſt term, the quotient will be the anſwer to the queſtion, and of the ſame denomination with the ſecond term.

Note 1ſt. The two terms of ſuppoſition are always obviouſly connected together, one of which is of the ſame name with the demanding term, and the other of the term ſought.

Note 2d. The reduction of the ſecond and third terms may ſometimes be omitted, and their product found as in COMPOUND MULTIPLICATION, dividing by the firſt term as in COMPOUND DIVISION.

Note 3d. When the firſt, and either the ſecond or third term can be divided by the ſame number, it is generally beſt to divide them, and uſe the quotients inſtead of the original terms. This is called *abbreviating the terms*, which includes every contraction in the RULE-OF-THREE.

QUESTION.

If 26 pounds of ſugar coſt 18*s.* 5*d.* what will 13 *cwt.* 1 *qr.* 18 *lb.* of the ſame article coſt?

Stated thus,

Firſt term.	*Middle, or 2d term.*	*Third term.*
pounds.	*s. d.*	*C. q. lb.*
If 26—(require)—	18 5—(what will)—	13 1 18 (require?)

In this example the two *terms of ſuppoſition* are 26 pounds and 18*s.* 5*d*; and the *term of demand*, or that which moves the queſtion is 13 *cwt.* 1 *qr.* 18 *lb*; alſo the *term ſought* is the *value* of 13 *cwt.* 1 *qr.* 18 *lb.* When the *value* or *price* of any thing is required, *money* muſt always be written in the *middle*, and the other term of ſuppoſition being written in the firſt place, there remains 13 *cwt.* 1 *qr.* 18 *lb.* the term of demand, for the third place. Reduce the *firſt* and *third* terms to the ſame denomination, that is, to pounds, and the *ſecond* or *middle* term to the loweſt name mentioned, namely, to pence. Then multiply the *ſecond* and *third* terms together, uſing the *ſmalleſt* or *moſt convenient* number for the multiplier, divide the product by the *firſt* term, and the quotient will be the anſwer to the queſtion in pence, the denomination to which the middle term was brought. Laſtly, reduce the anſwer to ſhillings and pounds, and you will find the value of the given quantity of ſugar to be 53*l.* 3*s.* 11*d.*

EXAMPLES.

1. If 6 yards of cloth coſt 24*s.* what will 73 yards coſt, at the ſame rate?

2. If 7 *yds.* 3 *qr.* of cloth coſt 28*s.* 5*d.* what will 69 *yds.* 1 *qr.* coſt?

3. If 6 yards of cloth coſt 24*s.* how many yards may be bought for 14*l.* 12*s?*

4. What will be the price of 92 yards of cambric, if 8 yards coſt 4*l.* 16*s?*

5. How many yards of cambric may be bought for 55*l.* 4*s.* when 8 yards coſt 4*l.* 16*s?*

6. Suppoſe 69 *yds.* 1 *qr.* of cloth to be worth 12*l.* 13*s.* 11*d.* what is the value of 7 *yds.* 3 *qr?*

7. If 69 *yds.* 1 *qr.* of cloth coſt 12*l.* 13*s.* 11*d.* how many yards may be bought for 28*s.* 5*d?*

8. If 9 ounces of ſilver coſt 2*l.* 13*s.* 7½*d.* what muſt be given for 23 ounces?

9. How much muſt be paid for 38 bags of hops, at the rate of 31*l.* 16*s.* for 12 bags?

10. If 8 *cwt.* 2 *qr.* of ſugar coſt 27*l.* 14*s.* 8*d.* what will be the price of 114 *cwt.* 3 *qr?*

11. What quantity of ſugar may be bought for 374*l.* 8*s.* when the price of 8 *cwt.* 2 *qr.* is 27*l.* 14*s.* 8*d?*

12. How many yards of muſlin may be bought for 49*l.* 8*s.* of which 11 yards coſt 7*l.* 3*s?*

13. How many yards of broad cloth may be bought for 4*l.* 16*s.* whereof 92 yards coſt 55*l.* 4*s?*

14. What quantity of ſugar may be bought for 27*l.* 14*s.* 8*d.* at 374*l.* 8*s.* for 114 *cwt.* 3 *qr?*

15. What muſt be paid for 51 *qrs.* 7 *buſh.* of corn, at 1*l.* 14*s.* 7*d. per* quarter?

16. What is the value of a ſilver cup that weighs 10 *lb.* 2 *oz.* 16 *dwt.* at 5*s.* 5*d. per* ounce?

17. Bought a ſilver cup weighing 10 *lb.* 2 *oz.* 16 *dwts.* for 33*l.* 5*s.* 2*d.* what did it coſt *per* ounce?

18. What muſt be given for 4 caſks of raiſins, each weighing 3 *cwt.* 3 *qr.* 21 *lb.* at the rate of 2*l.* 11*s.* 7*d. per cwt?*

19. Required the value of 17 *oz.* 12 *dwts.* of gold, at 3*l.* 18*s.* 10¾*d.* an ounce.

20. What will 95 *ells Eng.* 4 *qr.* of Holland coſt at 6*s.* 11*d. per* yard?

21. If $14\frac{3}{4}$ *lb.* of coffee coſt 1*l.* 16*s.* $10\frac{1}{2}$*d.* what will be the price of 3 *qr.* 19 *lb?*

22. Sold a piece of cloth for 3*l.* 11*s.* 3*d.* at the rate of 3*s.* $11\frac{1}{2}$*d. per* ell *Engliſh*; how many yards did it contain ?

23. What will be the tax upon 671*l.* 5*s.* at 3*s* 8*d. per* pound ?

24. How much ſilver may be bought for 283*l.* 16*s.* $8\frac{1}{4}$*d.* at the rate of 5*s.* 9*d. per* ounce ?

25. How much tobacco for 574*l.* at the rate of 13 *cwt.* for 127*l.* 8*s?*

26. What is the price of 7 *cwt.* 1 *qr.* 3 *lb.* of wool, at 7*s.* 2*d. per* ſtone of 14 *lb?*

27. What quantity of hops may I have for 100*l.* 14*s.* of which 12 bags coſt 31*l.* 16*s?*

28. How many ells *Engliſh* of Holland, may be bought for 41*l.* 8*s.* $3\frac{1}{4}$*d.* at 6*s.* 11*d. per* yard ?

29. A merchant failing in trade, owes to ſeveral 4011*l.* and compounds with them for 9*s.* $5\frac{3}{4}$*d. per* pound : what muſt he pay them in all ?

30. At 7*s.* $7\frac{1}{5}$*d. per* pound, what will be the compoſition for a debt of 430*l.* 8*s.* 4*d?*

31. What will 1 *qr.* 3 *nails* of velvet, coſt, at 17*s.* 8*d. per* yard ?

32. Seven pounds of ſuperfine tea being ſold for 5*l.* 19*s.* what weight may I have for 59*l.* 2*s.* $6\frac{3}{4}$*d?*

33. What muſt be given for 17 *cwt.* 17 *lb.* of raiſins, at 31*s. per cwt?*

34. If 1 ell of cloth coſt 4*s.* $11\frac{1}{2}$*d.* what will be the value of 11 pieces, each $31\frac{1}{4}$ yards ?

35. What coſt 51 *groſs*, 7 *doz.* of buttons, at $7\frac{1}{4}$*d. per* dozen ?

36. A bankrupt having paid his creditors 1901*l.* $11\frac{1}{4}$*d.* at the rate of 9*s.* $5\frac{3}{4}$*d. per* pound ; how much was he indebted ?

37. Bought 17 *cwt.* 17 *lb.* of raiſins for 26*l.* 11*s.* 8*d.* $1\frac{6}{7}$ *q.* what did they coſt *per cwt?*

38. If the tax upon 671*l.* 5*s.* be 123*l.* 1*s.* 3*d.* what is it *per* pound ?

39. If three-eighths of a ſhip be worth 388*l.* 17*s.* 6*d.* what is the value of the whole ?

40. What muſt I pay for ſeven ſixty-fourths of a ſhip, valued at 1037 pounds?

41. What will be the carriage of 3 *tons*, 7 *cwt*, 1 *qr*. 13 *lb*. at 3*d per* ſcore, or 20 *lb*?

42. What is the price of 2 *cwt*. 2 *qr*. 9 *lb*. of beef, at 6*s*. 1½*d*. *per* ſtone of 14 *lb*?

43. What coſt 30 pieces of lead, weighing each 3 *cwt*. 7 *lb*. at the rate of 15*s*. 2*d*. *per cwt*?

44. What is the yearly rent of a farm, containing 279 *ac*. 3 *r*. 15 *pls*. at 1*l*. 5*s*. 2*d*. *per* acre *per annum*?

45. If 3 yards of cloth coſt 8*s*. 8*d*. what muſt be given for 5 pieces, each 23 *yds*. 3 *qr*?

46. Bought 17 pockets of wool, weighing each 120 *lb*. what do they come to, at 4*l*. 17*s*. 4*d*. *per cwt*?

47. How much muſt be paid for 9 caſks of prunes, each 2 *cwt*. 3 *qr*. 16 *lb*. at 2*l*. 18*s*. 3*d*. *per cwt*?

48. What muſt be given for 77 *qrs*. 3 *pecks* of corn, at 4*s*. 3*d*. *per* buſhel?

49. What coſt 69 *ch*. 32 *buſh*. of coals, at the rate of 1*l*. 12*s*. 10*d*. *per* chaldron?

50. What will 100 pigs of lead, weighing in all 173 *cwt*. come to, at 14 guineas *per* fother of 19½ *cwt*?

51. What muſt be paid for 57 pieces of lead, each 2 *cwt*. 1 *qr*. 3 *lb*. at 15*l*. 18*s*. *per* fother of 21 *cwt*?

52. How many ingots of ſilver, each 2 *lb*. 1 *oz*. 17 *dwt*. may be bought for 260*l*. 2*s*. 3¾*d*. at the rate of 1 *oz*. for 5*s*. 9*d*?

53. A certain ſteeple projected on level ground a ſhadow, which was 232 feet long, when a ſtaff, 6 *feet*, 5 *in*. in length, ſtanding upright, caſt a ſhadow that meaſured 7 *feet*, 9 *in*. what was the height of the ſteeple?

As the ſhadow of the ſtaff, is to its length; ſo is the ſhadow of the ſteeple, to the height required.

54. If ſingle rum, at 7*s*. 6*d*. *per* gallon, bear 3 waters to one; what muſt be given for double rum, that bears 5 waters to one, and the quality of the punch equal to that of the former?

RULE-OF-THREE *Inverſe.*

IN the RULE-OF-THREE *inverſe*, there are given three numbers, to find a fourth, which ſhall have to the ſecond the ſame ratio which the firſt has to the third. If *more* require *leſs*, or *leſs* require *more*, the proportion is called *inverſe*.

RULE.

Having ſtated the queſtion, and prepared the terms, as in the RULE-OF-THREE *direct*, multiply the firſt and ſecond terms together, and divide the product by the third term; the quotient will be the anſwer to the queſtion, in the ſame denomination with the ſecond term.

Note 1. The reduction of the firſt and ſecond terms may ſometimes be omitted; and their product found as in COMPOUND MULTIPLICATION, dividing by the third term as in COMPOUND DIVISION.

Note 2. Divide the third, and either the ſecond or firſt term by the ſame number, and uſe the quotients inſtead of the original terms.

EXAMPLES.

1. How many men muſt be employed to finiſh a piece of work in 18 days, which 4 men can do in 45 days?

2. *A* borrowed of *B* upon an emergency 350*l.* 10*s.* for 51 days; afterwards *A* would return *B*'s favour, by lending him 105*l.* 3*s.* Required the time it muſt be lent.

3. A floor which is 23 feet, 6 *in.* long, and 18 feet, 3 *in.* broad, is to be covered with matting which is 1 foot, 6 *in.* broad; how much will it require?

4. In how many days will 4 men finiſh a piece of work, which 10 men can do in 18 days?

5. A garriſon being beſieged, has 3 months proviſions in it, at the rate of 14 ounces a day for each

man; but being informed that the place will be relieved at the end of 5 months, what muſt be the allowance *per* day, that the proviſions may ſerve that time?

6. Suppoſe a perſon travelling 16 hours a day, finiſhes a certain journey in 16 days: in how many days would he perform the ſame, if he travel 12 hours a day at the ſame rate?

7. If the penny-loaf weigh 7 *oz.* 14 *drs.* when wheat is at 6*s.* 4*d.* *per* buſhel, what ought the penny-loaf to weigh, when wheat is 4*s* 6*d* *per* buſhel?

8. If the carriage of 7 *cwt.* 3 *qrs.* for 76 miles be 1*l.* 18*s.* 10*d.* how far may I have 4 *cwt.* 21 *lb.* carried for the ſame money?

9. Suppoſe 3456 men were beſieged in a garriſon, and have proviſions for 5 months; how many men muſt leave the garriſon that the proviſions may ſerve the remainder 9 months?

10. Three feet in length, and 3 feet in breadth, being a ſquare yard; what length muſt be cut off a board 8 inches broad, to contain a ſquare yard?

11. What is wheat *per* buſhel when the penny-loaf weighs 11 *oz.* $1\frac{1}{3}$ *dr.* if it weighs 7 *oz.* 14 *dr.* when wheat is 6*s.* 4*d.* *per* buſhel?

12. How much ſhalloon, $\frac{3}{4}$ of a yard broad, will line a piece of cloth $3\frac{1}{2}$ yards in length, and $1\frac{1}{4}$ yard in breadth?

13. How many pounds of ſugar, at $9\frac{1}{2}$*d.* *per* pound, are equivalent to 23 pounds of tea, at 9*s.* 6*d.* *per lb?*

14. How many yards of *Iriſh* linen, at 1*s.* 11*d.* *per* yard, are equal to 92 pieces of Holland, each 20 yards, at 3*s.* 5*d.* *per* yard?

15. How many pieces of broad cloth may I have for 53 pieces of *India* chints, rating the former at 18*l.* 4*s.* and the latter at 22*l.* 15*s?*

16. There is a room, the length of which is 21 *f.* $9\frac{1}{2}$ *i.* and the breadth 15 *f.* 7 *i.* and the height 8 *f.* $1\frac{1}{2}$ *i.* which is to be lined with *India* paper, $22\frac{1}{2}$ *i.*

broad; how many yards will it require, and what will they amount to at 3*s*. 9*d*. each?

1. As the height of the room, is to its perimeter; ſo is the breadth of the paper, to the required quantity, inverſely.

2. Find its value by the RULE-OF-THREE *direct*.

DOUBLE RULE-OF-THREE.

IN the Double Rule-of-three, five numbers are given to find a ſixth, three of which contain a ſuppoſition, and two a demand.

RULE.*

Put the term of ſuppoſition, which is of the ſame name with the required term, in the middle; write the other terms of ſuppoſition under one another in the firſt place; and the remaining numbers, in the ſame order, in the third place.—Reduce the firſt and third of every row to the ſame denomination, and the ſecond to the loweſt mentioned.—Then proceed with each ſtating, as in the *ſingle* Rule-of-three, uſing the ſecond term in common for each of them, in order to find the ſeveral diviſors.—Having marked the diviſors, multiply the reſt of the terms together for a dividend, and the ſeveral diviſors together for a diviſor. The quotient will be the anſwer, and of the ſame denomination with the ſecond term.†

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* The rule which Mr. *Vyſe* has given in his *Tutor's Guide*, ſecond ed. pa. 80, (and which may be found alſo in many other books of arithmetic,) does not always give a true anſwer. Thus, the anſwer to queſtion 7 in the above treatiſe, as found by this rule, (ſee The *Key* to the *Tutor's Guide*, ſecond ed. pa. 113,) is 500 men, inſtead of $1531\frac{1}{4}$ men.

† *Note* 1. The terms of ſuppoſition are always obviouſly connected together, two of which are of the ſame name with the demanding terms, and the other of the term ſought.

2. Queſtions which have 7, 9, or more numbers given, are done by this rule.

3. In order to abbreviate the terms, write the numbers which compoſe the dividend above a line; and thoſe which make the diviſor under it; then cancel equal quantities, and divide others, as circumſtances will admit.

4. An even number may be divided by 2, and perhaps, by ſome multiple of 2.

5. Any number, ending with 5 or 0, is diviſible by 5.

6. Any number is diviſible by 4, or 25, if the number expreſſed by the two final figures be ſo: thus 116, and 375.

7. Any number is diviſible by 3, if the ſum of all the characters of which it is compoſed be ſo: thus, 78 is diviſible by 3, for 15, which is the ſum of 7 and 8, is ſo.

8. Any number is diviſible by 9, if the ſum of all the characters of which it is compoſed be ſo: thus 7821 is diviſible by 9.

QUESTION.

If 45 buſhels of oats ſerve 9 horſes 66 days, in how many days will 6 horſes conſume 40 buſhels?

In this queſtion the three *terms of ſuppoſition* are 45 buſhels, 9 horſes, and 66 days; and the *terms of demand* are 6 horſes, and 40 buſhels; alſo the *required term* is *time*, or the number of *days* in which 6 horſes will conſume 40 buſhels of oats. Put 66 days, the term of ſuppoſition which is of the ſame name with the required term, in the middle; write 45 buſhels, and 9 horſes, the other terms of ſuppoſition, under one another, in the firſt place; and the remaining numbers, namely, 40 buſhels, and 6 horſes in the ſame order in the third place. Thus,

Buſhels. Days. Buſhels.
*45 ——————————66—————————— 40
Horſes. Horſes.
9 ——————————×——————————*6

The proportion in the firſt ſtating is *direct*, becauſe a *leſs* quantity of oats will require a *leſs* number of days; and in the ſecond, *inverſe*, becauſe a *leſs* number of horſes will require a *greater* number of days to conſume any given quantity of oats. The diviſors are, conſequently, 45 and 6. Multiply the reſt of the terms, 66, 40, and 9 together, for a dividend, and 45 by 6, for a diviſor. The quotient will be 88, the anſwer to the queſtion, in days, which is the denomination of the ſecond term.

The terms being abbreviated, according to *Note* 3, will ſtand thus,

$$\begin{array}{ll} \text{Dividend,} & \overset{11}{66}\times\overset{8}{40}\times 9 \\ & \hline \\ \text{Diviſor,} & \underset{5}{45}\times 6 \end{array} = 88 \text{ days, the anſwer.}$$

EXAMPLES.

1. If 3 men can reap 17 acres of corn in 5 days; how many acres may be reaped by 7 men in 12 days?

2. If 18*l.* 15*s.* be the wages of 5 men for 12 weeks; what will be the wages of 16 men for 20 weeks?

3. If 3 men can reap 17 acres of corn in 5 days; how many men muſt be employed to reap 95 *acr.* 32 *pol.* in 12 days?

4. If 80 buſhels of corn ſerve 12 horſes 74 days; in how many days will 9 horſes eat 105 buſhels?

5. Suppoſe 5 men, in 12 weeks, draw 18*l.* 15*s.* how many weeks ought 16 men to work for 100*l*?

6. If a perſon travel 160 miles in 3 days, when the days are 11 hours long; in how many days, of 15 hours each, may he travel 1000 miles?

7. If 3450 *lb.* of beef ſerve 300 ſeamen 18 days, how many *lb.* will ſerve 175 ſeamen 26 days?

8. If the intereſt of 100*l.* for 1 year be 5*l.* what will be the intereſt of 450*l.* for 3 years?

9. If the carriage of 15 *cwt.* 2 *qr.* for 20 miles, be 3*l.* 10*s.* what will be the carriage of 57 *cwt.* 3 *qr.* for 172 miles?

10. If 9 men, in 10 days, build a wall 12 yards long; how many men muſt be employed to continue the wall 80 yards further, in 25 days, at the ſame rate of working?

11. If I pay $3\frac{3}{4}$*d.* for 9 ounces of bread, when corn is at 5*s.* *per* buſhel; what muſt be paid for 2 *lb.* 4 *oz.* when corn is at 4*s.* 2*d.* *per* buſhel?

12. What is the intereſt of 760*l.* for $5\frac{1}{2}$ years, at 4*l.* 2*s.* 6*d.* *per cent. per annum?*

13. A wall, 40 feet long, 3 feet thick, and 16 feet high, was completed by 18 men, in 12 days; how many men muſt be employed to build a wall 360 feet long, 8 feet thick, and 10 feet high, in 60 days?

14. If 1340 ſtones, 18 inches by 10, pave a certain court; how many marble ſquares, each 12 inches ſquare, will it require to pave the ſame, and what do they come to, at 2*s.* $6\frac{1}{2}$*d.* each?

15. What is the intereſt of 500*l.* for 14 weeks, at 4 *per cent. per annum?*

16. If the carriage of 150 feet of wood, which weighs 3 ſtone a foot, be 3*l.* for 40 miles; what will be the carriage of 54 feet of freeſtone, which weighs 8 ſtone a foot, for 25 miles?

17. What is the intereſt of 380*l.* for 146 days, at 5 *per cent. per annum?*

18. If 224 men, in $5\frac{1}{2}$ days of 11 hours each, dig a trench 231 yards long, 7 feet deep, and 11 feet broad; in how many days of 9 hours each, will 24 men dig a trench 357 yards long, 3 yards deep, and 5 yards broad?

PRACTICE.

PRACTICE is a ſhort method of finding the value of any quantity of goods, by the given price of an unit or integer.

TABLES *of* PARTS.

Even or aliquot parts of a pound.

s.	d.		
0	2	=	$\frac{1}{120}$
0	3	=	$\frac{1}{80}$
0	4	=	$\frac{1}{60}$
0	6	=	$\frac{1}{40}$
0	8	=	$\frac{1}{30}$
1	0	=	$\frac{1}{20}$
1	3	=	$\frac{1}{16}$
1	4	=	$\frac{1}{15}$
1	8	=	$\frac{1}{12}$
2	0	=	$\frac{1}{10}$
2	6	=	$\frac{1}{8}$
3	4	=	$\frac{1}{6}$
4	0	=	$\frac{1}{5}$
5	0	=	$\frac{1}{4}$
6	8	=	$\frac{1}{3}$
10	0	=	$\frac{1}{2}$

Parts of a ſhilling.

d.		
1	=	$\frac{1}{12}$
$1\frac{1}{2}$	=	$\frac{1}{8}$
2	=	$\frac{1}{6}$
3	=	$\frac{1}{4}$
4	=	$\frac{1}{3}$
6	=	$\frac{1}{2}$

Parts of ſix-pence.

d.		
$\frac{1}{2}$	=	$\frac{1}{12}$
$\frac{3}{4}$	=	$\frac{1}{8}$

Parts of three-pence.

d.		
$\frac{1}{4}$	=	$\frac{1}{12}$
$\frac{1}{2}$	=	$\frac{1}{6}$
$\frac{3}{4}$	=	$\frac{1}{4}$

EXAMPLES.

	yds.		*d.*			*yds.*		*d.*	
1.	7185	at	$\frac{1}{2}$	*per yd.*	4.	5103	at	$1\frac{1}{2}$	*per yd.*
2.	857	at	$\frac{1}{2}$	——	5.	8237	at	2	——
3.	1738	at	1	——	6.	446	at	$2\frac{1}{2}$	——

7.

DIRECTIONS.

1. Divide the given number by 12, for ſix-pences, and the quotient by 40, for pounds.

3. Reduce 1738 pence to ſhillings and pounds.

4. Divide by 8, for ſhillings, and the quotient by 20, for pounds.

5. Divide by 120, the aliquot part of 2*d.* and the quotient will be the anſwer in pounds. The remainder, which is ſo many two-pences, may be divided by 6, for ſhillings.

6. Divide by 12, for half-crowns, and the quotient by 8 for the anſwer in pounds.

7. 3*d.*

	yds.		*d.*	
7.	4772	at	3	*per yd.*
8.	6019	at	$3\frac{1}{2}$	——
9.	974	at	4	——
10.	6101	at	$4\frac{1}{2}$	——
11.	788	at	5	——
12.	703	at	$5\frac{1}{2}$	——
13.	7201	at	6	——
14.	3817	at	$6\frac{1}{2}$	——
	oz.		*d.*	
15.	9431	at	7	*per oz.*
16.	831	at	$7\frac{1}{2}$	——
17.	567	at	8	——
	oz.		*d.*	
18.	2780	at	$8\frac{1}{2}$	*per oz.*
19.	107	at	9	——
20.	410	at	$9\frac{1}{2}$	——
21.	5326	at	10	——
22.	7002	at	$10\frac{1}{2}$	——
23.	619	at	11	——
24.	1270	at	$11\frac{1}{2}$	——
25.	954	at	12	——
26.	464	at	$12\frac{1}{2}$	——
27.	1900	at	13	——
28.	715	at	$13\frac{1}{2}$	——

DIRECTIONS.

7. 3*d.* is an aliquot part of a pound.

8. Take 3*d.* an $\frac{1}{80}$ of a pound, as in the laſt example, and a $\frac{1}{2}$*d.* a $\frac{1}{6}$ of that line, and add both lines together. The ſecond line is found by compound diviſion.

10. 3*d.* an $\frac{1}{80}$, and $1\frac{1}{2}$*d.* half of 3*d.* and add, as in the 8th example.

11. Divide by 12, for crowns, and reduce the quotient to pounds.

12. 6*d.* a $\frac{1}{40}$, and ſubtract $\frac{1}{2}$*d.* which is a $\frac{1}{12}$ of 6*d.*

14. Take the ſame parts as in the 12th example, and the *ſum* of both lines will be the anſwer.

15. 6*d.* is an aliquot part of a pound, and 1*d.* a $\frac{1}{6}$ of 6*d.*

16. Divide by 4, for half-crowns, and reduce the quotient to pounds.

18. Take 8*d.* a $\frac{1}{30}$, and $\frac{1}{2}$*d.* a $\frac{1}{16}$ of 8*d.* and add.

19. 6*d.* a $\frac{1}{40}$ of a pound, and 3*d.* an $\frac{1}{80}$, or, which is better, a $\frac{1}{2}$ of the line for 6*d.*

20. This example requires three lines, firſt for 6*d.* which is an aliquot part of a pound, then 3*d.* a $\frac{1}{2}$ of 6*d.* and, laſtly, $\frac{1}{2}$*d.* a $\frac{1}{6}$ of 3*d.*

21. Annex a cipher, and divide by 12, and 20.

22. Take $1\frac{1}{2}$*d.* an $\frac{1}{8}$ of a ſhilling, ſubtract the quotient from the firſt line, and reduce the ſhillings in the remainder to pounds.

23. Take 1*d.* a $\frac{1}{12}$ of a ſhilling, ſubtract, and reduce the remainder to pounds.

24. In three lines, 8*d.* 3*d.* and $\frac{1}{2}$*d.*

26. In three lines, 6*d.* 6*d.* and $\frac{1}{2}$*d.*

27. Take 1*d.* a $\frac{1}{12}$ of a ſhilling, add, and reduce the ſum to pounds.

28, and 29. Like the 27th.

ells. *d.*

29. 1477 at 14 *per ell*

30. 513 at $14\frac{1}{2}$ ——

31. 381 at 15 ——

32. 1311 at $15\frac{1}{2}$ ——

33. 511 at 16 ——

34. 521 at $16\frac{1}{2}$ ——

35. 819 at 17 ——

36. 215 at $17\frac{1}{2}$ ——

37. 737 at 18 ——

38. 719 at $18\frac{1}{2}$ ——

39. 305 at 19 ——

40. 6101 at $19\frac{1}{2}$ ——

41. 725 at 20 ——

42. 1171 at $20\frac{1}{2}$ ——

lb. *d.*

43. 3003 at 21 *per lb.*

44. 923 at $21\frac{1}{2}$ ——

45. 1676 at 22 ——

46. 815 at $22\frac{1}{2}$ ——

47. 1070 at 23 ——

48. 7924 at $23\frac{1}{2}$ ——

s.

49. 632 at 2 ——

d.

50. 2201 at $\frac{1}{4}$ ——

51. 8110 at $\frac{3}{4}$ ——

52. 8117 at $1\frac{1}{4}$ ——

53. 2863 at $1\frac{3}{4}$ ——

54. 1552 at $2\frac{1}{4}$ ——

55. 1160 at $2\frac{3}{4}$ ——

56.

DIRECTIONS.

30. Take 15*d.* a $\frac{1}{16}$ of a pound, and $\frac{1}{2}$*d.* a $\frac{1}{30}$ of 15*d.* and ſubtract.

34. Take 15*d.* as in the preceding examples, and $1\frac{1}{2}$*d.* a $\frac{1}{10}$ of 15*d.*

35. Take 20*d.* and 3*d.* each aliquot parts of a pound, and ſubtract.

36. Take 20*d.* a part of a pound, and $2\frac{1}{2}$*d.* a part of 20*d.* and ſubtract.

37, and 38. By the ſhilling method, like the 27th example.

39. From 20*d.* ($\frac{1}{12}$ of a pound) ſubtract 1*d.* ($\frac{1}{20}$ of 20*d*)

43. From 2*s.* ſubtract 3*d.*

44. In three lines, 20*d.* 1*d.* and $\frac{1}{2}$*d.*

46. Take the ſame parts as in the 36th example, and *add.*

50. Divide the given number by 12, for three-pences, and the quotient by 80, for pounds. This is only a ſpeedier method of reducing *farthings* to *pounds.* The common way is to divide by 4, 12, and 20.

51. Divide by 8, for ſix-pences, and reduce the quotient to pounds.

52. Divide by 12, for fifteen-pences, and the quotient by 16, for pounds.

53. From 2*d.* ($\frac{1}{120}$ of a pound) ſubtract $\frac{1}{4}$*d.* ($\frac{1}{8}$ of 2*d.*)

54, 55, and 56. Similar to the 53d. example.

feet. *d.*

56. 913 at 3¼ *per foot*
57. 1081 at 3¾ ——
58. 1001 at 4¼ ——
59. 3111 at 4¾ ——
60. 238 at 5¼ ——
61. 1117 at 5¾ ——
62. 2710 at 6¼ ——
63. 413 at 6¾ ——
64. 2136 at 7¼ ——
65. 1342 at 7¾ ——
66. 5155 at 8¼ ——
67. 1610 at 8¾ ——
68. 191 at 9¼ ——

pair. *d.*

69. 1714 at 9¾ *per pr.*
70. 104 at 10¼ ——

pair. *d.*

71. 9000 at 10¾ *per pr.*
72. 4063 at 11¼ ——
73. 5154 at 11¾ ——
74. 1313 at 12¼ ——
75. 1234 at 12¾ ——
76. 345 at 13¼ ——
77. 987 at 13¾ ——
78. 654 at 14¼ ——
79. 321 at 14¾ ——
80. 11310 at 15¼ ——
81. 233 at 15¾ ——

yds. *d.*

82. 1900 at 16¼ *per yd.*
83. 1018 at 16¾ ——
84. 435 at 17¼ ——
85. 4134 at 17¾ ——

DIRECTIONS.

57. Divide by 8, for half-crowns, and the quotient by 8, for pounds.

59. In three lines, 3*d.* 1½*d.* and ¼*d.*

60. From 6*d.* ſubtract ¾*d.*

65. In three lines, 6*d.* 1½*d.* and ¼*d.*

67. 6*d.* 2*d.* and ¾*d* ($\frac{1}{8}$ of 6*d.*)

72. Take ¾*d.* a $\frac{1}{16}$ of a ſhilling, ſubtract, and the remainder will be the anſwer in ſhillings.

73. Conſider the given number as farthings, and reduce them to pence, and ſhillings; then ſubtract the reſult from the firſt line, (conſidered as ſhillings,) and the remainder will be the anſwer in ſhillings.

74. Proceed as in the 73d. example, and uſe addition inſtead of ſubtraction.

75. Similar to the 72d. the price in this queſtion being juſt as much *more*, as in that example it was *leſs*, than 1*s.*

76. In three parts, 1*s.* 1*d.* and ¼*d.*

77. From 15*d.* ſubtract 1¼*d* ($\frac{1}{12}$ of 15*d.*)

78, 79, 80, 81, and 82. Take 15*d.* a $\frac{1}{16}$ of a pound, and ſubtract or add the difference between the given price and 15*d.*

83. In three parts, 15*d.* 1½*d.* and ¼*d.*

84. 15*d.* 1½*d.* and ¾*d.*

85. 15*d.* 2½*d.* and ¼*d.*

yds. *d.*

86. 586 at 18¼ *per yd.*
87. 6183 at 18¾ ——
88. 437 at 19¼ ——
89. 174 at 19¾ ——
90. 146 at 20¼ ——
91. 156 at 20¾ ——
92. 177 at 21¼ ——
93. 201 at 21¾ ——
94. 731 at 22¼ ——
95. 490 at 22¾ ——
96. 9114 at 23¼ ——
97. 419 at 23¾ ——

gal. *s.* *d.*

98. 971 at 2 1 *per g.*
99. 524 at 2 3 —
100. 418 at 2 5 —
101. 127 at 2 6 —

gal. *s.* *d.*

102. 221 at 2 8½ *per g.*
103. 313 at 2 11 —
104. 545 at 3 0 —
105. 210 at 3 3¾ —
106. 183 at 3 7 —
107. 1781 at 3 9¾ —
108. 310 at 3 10 —
109. 2181 at 4 0 —
110. 818 at 4 5 —
111. 161 at 4 7 —
112. 2611 at 4 8 —
113. 174 at 4 10 —

buſh. *s.* *d.*

114. 1143 at 5 0 *per b.*
115. 745 at 5 1 —
116. 209 at 5 7½ —
117. 234 at 5 10¼ —

118.

DIRECTIONS.

87. From 20*d.* ſubtract 1¼*d.* ($\frac{1}{16}$ of 20*d.*)
88. In three parts, 16*d.* 3*d.* and ¼*d.*
89. From 20*d.* ſubtract ¼*d.* ($\frac{1}{80}$ of 20*d.*)
91. In three parts, 20*d.* ½*d.* and ¼*d.*
92. Vide 87th.
93. 15*d.* 6*d.* and ¾*d.*
95. 20*d.* 2½*d.* and ¼*d.*
98. To 20*d.* add 5*d.* or, from 2*s.* 6*d.* ſubtract 5*d.*
102. To 2*s.* 6*d.* add 2½*d.* ($\frac{1}{12}$ of 2*s.* 6*d.*)
103. To 2*s.* 6*d.* add 5*d.* ($\frac{1}{6}$ of 2*s.* 6*d.*)
104. Multiply the given quantity by 3, and the product will be the anſwer in ſhillings.
105. In three parts, 2*s.* 1*s.* 3*d.* and ¾*d.*
107. 2*s.* 6*d.* 1*s.* 3*d.* and ¾*d.*
108. To 3*s.* 4*d.* add 6*d.*
111. From 5*s.* ſubtract 5*d.* ($\frac{1}{12}$ of 5*s.*)
112. To 4*s.* add 8*d.* ($\frac{1}{6}$ of 4*s.*) or, from 5*s.* ſubtract 4*d.* ($\frac{1}{60}$ of a pound.)
116. To 5*s.* add 7½*d.* ($\frac{1}{8}$ of 5*s.*)
117. In three parts, 5*s.* 10*d.* and ¼*d.*

118. When

	buſh.		*s.*	*d.*	
118.	194	at	6	0	*per b.*
119.	707	at	6	5	—
120.	716	at	6	8	—
121.	153	at	7	0	—
122.	511	at	7	1	—
123.	273	at	7	6	—
124.	237	at	7	8¾	—
125.	401	at	7	11	—
126.	137	at	8	0	—
127.	239	at	8	3	—
128.	1144	at	8	9	—
129.	315	at	9	4	—
130.	148	at	9	10	—
	ells		*s.*	*d.*	
131.	2211	at	10	0	*p.ell.*

	ells.		*s.*	*d.*	
132.	166	at	10	7¾	*p.ell*
133.	902	at	10	10	—
134.	666	at	11	0	—
135.	173	at	11	9	—
136.	796	at	12	0	—
137.	344	at	12	7	—
138.	912	at	13	5	—
139.	1308	at	13	11	—
140.	185	at	14	3	—
141.	237	at	15	0	—
	cwt.		*s.*	*d.*	
142.	301	at	15	4	*p.C.*
143.	677	at	16	0	—
144.	679	at	16	8	—
145.	321	at	16	10½	—

146.

DIRECTIONS.

118. When the price is 6*s.* 8*s.* 12*s.* 14*s.* &c. multiply the given quantity by *half* the number of ſhillings, and double the firſt figure of the product, for ſhillings; and the other part of the product will be the anſwer in pounds.

121. Is ſimilar to the 104th. example.

122. To 6*s.* 8*d.* add 5*d.* ($\frac{1}{10}$ of 6*s.* 8*d.*)

123. To 5*s.* add 2*s.* 6*d.* ($\frac{1}{2}$ of 5*s.*)

124. In three parts, 6*s.* 8*d.* 1*s.* and ¾*d.*

125. 6*s.* 8*d.* and 1*s.* 3*d.*

127. For 8*s.* obſerve the directions which were given above, example 118, and take 3*d.* an $\frac{1}{80}$ of a pound, and add.

128. From 10*s.* ſubtract 1*s.* 3*d.* ($\frac{1}{8}$ of 10*s.*)

132. In three parts, 10*s.* 7½*d.* and ¼*d.*

134. Is ſimilar to the 104th.

135. From 12*s.* (6 two-ſhillings,) ſubtract 3*d.* $\frac{1}{80}$ of a pound.)

137. In three parts, 10*s.* 2*s.* 6*d.* and 1*d.*

139. To 12*s.* (6 two-ſhillings,) add 1*s.* 8*d.* ($\frac{1}{12}$ of a pound,) and 3*d.* ($\frac{1}{80}$)

140. To 14*s.* ($\frac{7}{10}$ of a pound,) add 3*d.* ($\frac{1}{80}$ of a pound.)

141. Multiply the quantity by 3, and the product will be the anſwer in crowns.

142. From 16*s.* ($\frac{8}{10}$ of a pound,) ſubtract 8*d.* ($\frac{1}{30}$ of a pound.)

144. Take 3*s.* 4*d.* a $\frac{1}{6}$ of a pound, and ſubtract the reſult from the firſt line, conſidered as pounds.

145. Multiply the given number by 17 for 17*s.* take 1½*d.* an $\frac{1}{8}$ of a ſhilling, ſubtract, and the remainder will be the anſwer in ſhillings.

	cwt.		*l.*	*s.*	*d.*	
146.	512	at		17	0	*per C.*
147.	979	at		17	6	—
148.	256	at		17	7¼	—
149.	395	at		18	0	—
150.	430	at		18	4	—
151.	196	at		18	9	—
152.	797	at		19	8½	—
			l.	*s.*	*d.*	
153.	979	at	1	4	0	—
154.	136	at	1	7	2	—
155.	1113	at	1	11	3	—
156.	5325	at	1	15	6	—
	tuns.		*l.*	*s.*	*d.*	
157.	1431	at	1	18	0	*p.t.*

	tuns.		*l.*	*ſ.*	*d.*	
158.	6431	at	2	3	1½	*p.t.*
159.	173	at	2	8	0	—
160.	5714	at	2	16	6	—
161.	713	at	3	13	0	—
162.	465	at	4	0	4	—
163.	391	at	5	0	0	—
164.	982	at	7	15	0	—
165.	372	at	9	11	6	—
166.	1353	at	13	0	0	—
167.	185	at	17	16	0	—
168.	617	at	19	19	9	—
	lbs.					
169.	371½	at	0	2	7	*p.l.*

170.

DIRECTIONS.

146. To 16*s.* ($\frac{8}{10}$ of a pound,) add 1*s.* ($\frac{1}{20}$ of a pound.)

147. Take 2*s.* 6*d.* an $\frac{1}{8}$ of a pound, and ſubtract the reſult from the firſt line.

148. In four parts, 14*s.* ($\frac{7}{10}$ of a pound,) 3*s.* 4*d.* 3*d.* and $\frac{1}{4}$*d.*

149, 150, and 151. Theſe examples are ſimilar to the 147th.

152. In three parts, 18*s.* 1*s.* 8*d.* and ½*d.*

154. Add 6*s.* 8*d.* and 6*d.* (each aliquot parts of a pound,) to the firſt line, and the ſum will be the anſwer.

155, and 156. Theſe examples are ſimilar to the 154th.

157. Multiply by 19 for 38*s.* and double the unit's figure of the product, as in the 118th. example.

158. Write the given quantity under itſelf, for 2 pounds; and take aliquot parts for 2*s.* 6*d.* and 7½*d.*

159 This example is ſimilar to the 157th.

160. Multiply by 28, (that is 7 times 4,) for 56*s.* and add 6*d.* which is a $\frac{1}{40}$ part of a pound.

161. Multiply by 3, for 3 pounds; and take 12*s.* a $\frac{1}{5}$ of 3 pounds, and 1*s.* a $\frac{1}{20}$ of a pound.

163. Annex a cipher, and divide by 2.

164. From 8 pounds, (8 times the given quantity,) ſubtract 5*s.* ($\frac{1}{4}$ of a pound.)

165. In three parts, 9*l.* 9*s.* ($\frac{1}{20}$ of 9*l.*) and 2*s.* 6*d.*

169. In this, and the ſubſequent examples, work for the integral part of the quantity as in the former examples, and, previous to addition, ſet down the value of the fractional part; which value is found by multiplying the price by the upper number, and dividing the product by the lower number.

cwt. *l.* *s.* *d.*

170. 1197$\frac{1}{4}$ at 2 9 2*p.C.*

pieces.

171. 1617$\frac{3}{4}$ at 6 6 6*p.p.*

yd.

172. 394$\frac{5}{8}$ at 0 14 0 *p.y.*

173. 9495$\frac{7}{8}$ at 0 17 9$\frac{1}{2}$ —

tuns. *l.* *s.* *d.*

174. 264$\frac{5}{9}$ at 3 14 10*p.t.*

yds.

175. 6616$\frac{3}{13}$ at 0 17 4$\frac{1}{2}$*p.*

176. 454$\frac{1}{12}$ at 0 4 6 —

177. 838$\frac{7}{10}$ at 0 3 8 *per hhd.*

178. 1591$\frac{2}{5}$ at 4 7 0 —

WEIGHTS *by* PRACTICE.

TABLES *of* PARTS.

Parts of a ton.					*Parts of an cwt.*			*Parts of a qu.*		
C.	*Q.*	*lb.*			*lb.*			*lb.*		
1	0	0	=	$\frac{1}{20}$	8	=	$\frac{1}{14}$	14	=	$\frac{1}{2}$
2	0	0	=	$\frac{1}{10}$	7	=	$\frac{1}{16}$	7	=	$\frac{1}{4}$
2	2	0	=	$\frac{1}{8}$	14	=	$\frac{1}{8}$	4	=	$\frac{1}{7}$
2	3	12	=	$\frac{1}{7}$	16	=	$\frac{1}{7}$	3$\frac{1}{2}$	=	$\frac{1}{8}$
4	0	0	=	$\frac{1}{5}$	*Qu.*			2	=	$\frac{1}{14}$
5	0	0	=	$\frac{1}{4}$	1	=	$\frac{1}{4}$	1$\frac{3}{4}$	=	$\frac{1}{16}$
10	0	0	=	$\frac{1}{2}$	2	=	$\frac{1}{2}$	1	=	$\frac{1}{28}$

Note. Parts of a pound, yard, acre, &c. are commonly obvious, and when otherwiſe, are eaſily found by this rule; divide the integer, or any part of it, by the quantity to be taken for, and the quotient will be the aliquot part required. The diviſor and dividend, if of different denominations, muſt previouſly be reduced to the ſame denomination.

Rule. Find the value of the integer, either by Multiplication or Simple Practice, and take aliquot parts for the other quantities.

EXAMPLES.

l. *s.* *d.*

179. 12 *cwt.* 3 *qr.* of ſugar, at 2 16 6 *per cwt.*

180. 5 *cwt.* 2 *q.* 16 *lb.* of ſugar, at 1 17 4 ———

181. 7 *cwt.* 1 *qr.* 7 *lb.* of ſugar, at 2 17 1 ———

182. 1 *cwt.* 8 *lb.* of ſugar, at 2 13 8 ———

183. 3 *cwt.* 3 *qr.* 12 *lb.* of tobacco, at 3 19 2$\frac{1}{4}$ ———

184. 2 *cwt.* 2 *qr.* 18 *lb.* of hops, at 4 11 3$\frac{1}{2}$ ———

			l.	*s.*	*d.*
185.	9 *cwt.* 1 *qr.* 12 *lb.*	at	4	5	9 *per cwt.*
186.	2 *qr* 3½ *lb.*	at	1	10	8 ——
187.	3 *qr.* 11 *lb.*	at	0	14	7 ——
188.	23 *lb.*	at	23	2	0 ——
189.	4 *cwt.* 3 *qr.* 9¼ *lb.*	at	0	15	5½ ——
190.	11 *cwt.* 1 *qr.* 25¾ *lb.*	at	0	12	9 ——
191.	138 *cwt.*	at	4	5	0 ——
192.	71 *cwt.* 1 *qr.* 14 *lb.*	at	7	7	10½ ——
193.	13 *cwt.* 1 *qr.* 26 *lb.*	at	0	1	3¼ *per lb.*
194.	211 *cwt.* 17 *lb.*	at	0	3	8 ——
195.	2822 *lb.*	at	5	13	4 *per C.*
196.	3 *tons,* 10 *cwt.* 1 *qr.*	at	40	6	2 *per ton*
197.	17 *tons,* 2 *cwt.* 3 *qrs.* 12 *lb.*	at	9	0	0 ——
198.	9 *lb.* 6 *oz. av.*	at	0	1	10 *per lb.*
199.	217 *lb.* 3 *oz.* 12 *dwt.*	at	0	10	1 ——
200.	81 *lb.* 5 *oz.* 10 *dwt.*	at	2	4	6 ——
201.	4 *oz.* 15 *dwt.* 5 *grs.*	at	4	0	0 *per oz.*
202.	5 *yds.* 2 *qr.* 1 *nl.*	at	0	5	4 *per yd.*
203.	21 *yds.* 1 *qr.* 3 *nls.*	at	0	2	2 ——
204.	3 *qrs.* 2 *nls.*	at	0	15	10 ——
205.	10 *Eng.* ells, 1 *qr.* 1 *nl.*	at	0	16	2¼ *per e.*
206.	7 *bar. b.* 6 *gal.*	at	0	13	6 *per bar.*
207.	11 *gal.* 5 *pts.*	at	0	0	10 *p. gal.*
208.	27 *ac.* 1 *r.* 5 *p.*	at	1	7	7 *per ac.*
209.	13 *ac.* 3 *r.* 24 *p.*	at	1	17	3½ ——
210.	921 *ac.* 36 *p.*	at	0	18	8 ——

Note. Of cheeſe and ſoap,

4 *qrs.* or 120 *lb.* } make 1 } *cwt.*
30 pounds } make 1 } quarter.

EXAMPLES.

			l.	*s.*	*d.*
211.	1 *cwt.* 1 *qr.* 15 *lb.* of cheeſe,	at	2	7	0 *per cwt.*
212.	4 *cwt.* 1 *qr.* 10 *lb.* of cheeſe,	at	2	1	6 ——
213.	2 *cwt.* 1 *qr.* 23 *lb.* of ſoap,	at	3	12	0 ——
214.	1 *cwt.* 0 *qr.* 24 *lb.* of cheeſe,	at	2	2	6 ——
215.	1 *cwt.* 3 *qr.* 1 *lb.* of cheeſe,	at	2	4	6 ——
216.	7 *cwt.* 2 *qr.* 19. *lb.* of ſoap,	at	3	6	6 ——

TARE *and* TRET.

TARE is an allowance on goods for the weight of the package; and is at either ſo much for the whole, ſo much *per* hogſhead, barrel, cheſt, *&c.* or ſo much *per cwt.*

Tret is an allowance of 4 *lb.* on every 104 *lb.* on account of duſt, or other waſte.

Clough is an allowance of 2 *lb.* on every 3 *cwt.* for the turn of the ſcale, when the goods are ſold by retail.

Groſs is the whole weight, before any deductions are made.

Suttle is what remains after *part* of the allowances are deducted.

And, *Neat* is what remains after *all* the allowances are deducted.

CASE I.

When the *tare* is at ſo much for the whole.

RULE.

Subtract the given *tare* from the *groſs*, and the remainder will be the *neat* weight required.

EXAMPLES.

1. Groſs weight 19 *cwt.* 3 *qrs.* 11 *lb.* tare 2 *cwt.* 1 *qr.* 17 *lb.* what is the neat?

2. What is the neat weight of 95 barrels of indigo, weighing groſs 489 *cwt.* 3 *qrs.* 5 *lb.* allowing 14 *cwt.* 26 *lb.* tare?

3. Groſs 16 *cwt.* 2 *qrs.* tare 65 *lb.* how many *lbs.* neat, and what will they come to at $9\frac{1}{2}$*d per lb?*

CASE II.

When the *tare* is at ſo much *per* hogſhead, barrel, cheſt, *&c. and* 1. *when the groſs and tare of each are the ſame.*

RULE.

Subtract the *tare* of 1 *hhd.* from the *groſs* of 1 *hhd.* multiply the remainder by the number of *hhds.* and the product will be the anſwer.

2. *When the groſs and tare of each are not the ſame.*

RULE.

Subtract the *tare* of all the *hhds.* from the *groſs* of all the *hhds.* and the remainder will be the anſwer.

EXAMPLES.

4. What is the neat weight of 7 *hhds.* of tobacco, each weighing groſs 10 *cwt.* 1 *qr.* 9 *lb.* tare 3 *qrs.* 15 *lb. per hhd?*

5. What is the neat weight of 55 bales of *Cyprus* ſilk, each 237 *lb.* groſs, tare 19 *lb. per* bale?

6. In 37 bags of cotton, each 24 *cwt.* 2 *qrs.* tare 98 *lb. per* bag, how much neat? and what will they coſt, at 13¼*d. per lb?*

7. What is the neat weight of 4 *hhds.* of ſugar, weighing as follows?

	cwt.	*qrs.*	*lb.*		*lb.*
No. 1.	2	3	13	tare	17
2.	3	0	7	——	20
3.	3	1	16	——	22
4.	5	1	20	——	31

8. Find the neat of 4 caſks of raiſins, weighing as under;

	cwt.	*qrs.*	*lb.*	
No. 1.	3	0	27,	tare of the whole 2 *cwt.* 3 *lb.*
2.	5	3	8	
3.	2	1	19	
4.	1	2	3	

9. What is the value of the neat weight of 5 *hhds.* of *Virginia* tobacco, weighing as under, at 4*l.* 3*s.* 8*d.* *per cwt?* *viz.*

	cwt.	*qrs.*	*lb.*	
No. 1.	5	3	17,	tare of each *hhd.* 100 *lb.*
2.	5	0	27	
3.	5	1	26	
4.	5	3	27	
5.	5	2	0	

CASE III.

When the *tare* is at ſo much *per cwt.*

RULE.

Obſerve what part, or parts the given *tare* is of an *cwt.* and take the ſame part, or parts of the *groſs* weight, the quotient or quotients added together, will be the *tare*, which ſubtract from the *groſs*, and the remainder will be the *neat* required.

OR, As 112 : its *neat* weight : : the given *groſs* : the *neat* required.

EXAMPLES.

10. Groſs 17 *cwt.* 1 *qr.* 14 *lb.* tare 16 *lb. per cwt.* how much neat?

11. What is the neat of 21 barrels of figs, weighing each 2 *cwt.* 1 *qr.* 18 *lb.* tare 14 *lb. per cwt?*

12. What is the value of 504 *cwt.* 2 *qrs.* 7 *lb.* of cotton, at 5*l.* 9*s.* 3*d. per cwt.* allowing 4 *lb. per cwt.* tare?

13. How many gallons are contained in 3 caſks of oil, weighing as follows, (namely) No. 1. 3 *cwt.* 17 *lb.* No. 2. 2 *cwt.* 3 *qrs.* No. 3. 4 *cwt.* 11 *lb.* de-

deducting 18 *lb. per cwt.* tare, and allowing 7½ *lb.* neat to a gallon?

Note. To reduce pounds neat into gallons, multiply by 4, and divide the product by 30.

14. In 7 caſks of oil, weighing each 364 *lb.* groſs, tare 10 *lb. per cwt.* how many gallons?

CASE IV.

When *tret* is allowed.

RULE.

Having ſubtracted the *tare* from the *groſs*, divide the remainder by 26, and the quotient will be the *tret*, which ſubtract from the *ſuttle*, and the remainder will be the anſwer.

EXAMPLES.

15. In 9 *cwt.* 2 *qrs.* 17 *lb.* groſs, tare 1 *qr.* 13 *lb.* and tret 4 *lb. per* 104 *lb.* how much neat?

16. Groſs 97 *cwt.* 1 *qr.* 17 *lb.* tare 1 *cwt.* 3 *qrs.* 1 *lb.* and tret 4 *lb. per* 104 *lb.* how many *lbs.* neat?

17. In 7 caſks of prunes, each 2 *cwt.* 16 *lb.* groſs, tare 17½ *lb. per cwt.* and tret 4 *lb. per* 104 *lb.* how much neat?

CASE V.

When *clough* is allowed.

RULE.

Having made the deductions for *tare* and *tret*, multiply the laſt *ſuttle* by 2, and divide by 3, the *cwt.* and *qrs.* in the quotient, will be the *lbs.* and *qrs.* of a *lb. clough*, which ſubtract from the *ſuttle*, and the remainder will be the *neat* weight.

Ex-

EXAMPLES.

18. What is the neat of 9 *cwt.* 2 *qrs.* 15 *lb.* groſs, tare 1 *cwt.* 3 *qrs.* 25 *lb.* tret 4 *lb. per* 104 *lb.* and clough 2 *lb. per* 3 *cwt?*

19. In 4 caſks of currants, each 6 *cwt.* 3 *qrs.* 13 *lb.* groſs, tare 2 *qrs.* 11 *lb. per* caſk, tret 4 *lb. per* 104 *lb.* and clough 2 *lb. per* 3 *cwt.* how much neat?

20. What is the neat of 6 *hhds.* of tobacco, weighing all together 66 *cwt.* 13 *lb.* groſs, tare 13 *lb. per cwt.* tret 4 *lb. per* 104 *lb.* and clough 2 *lb. per* 3 *cwt.* and what will the neat amount to, at 7$\frac{3}{4}$*d. per lb?*

End of the Queſtions.

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2. Here alſo a greater name, ſhillings, is to be reduced to a leſſer name, pence; therefore multiply by the number of pence in a ſhilling.

3. In this example, ſhillings are to be brought to pounds—a leſſer name to a greater; therefore divide by 20.

5. Divide by 12, becauſe 12 pence make 1 ſhilling; the quotient will be ſhillings, and the remainder pence. Write *s.* under the former, and *d.* under the latter.

8. Multiply 73, the number of pounds, by 20, and add 7 to the unit's figure of the product.

13. Multiply 47 by 20, and add 3 to the firſt, and 1 to the ſecond figure of the product.

14. Multiply the given number of pounds by 20, and the product will be ſhillings; which multiply by 12, and the laſt product will be the number of pence in 37 pounds.

15. Multiply 8 by 20, and take in 15, for ſhillings; multiply the ſhillings by 12, and take in 6, for the anſwer in pence. Write the word *ſhillings* oppoſite to the former, and *pence* oppoſite to the anſwer.

17. Divide the given number of pence by 12, and the quotient will be ſhillings; divide the ſhillings by 20, and the reſult will be pounds. The firſt remainder is pence, and the ſecond remainder, ſhillings. Annex the remainders to the anſwer, in this manner, 7*l.* 4*s.* 3*d.*

19. Multiply the pounds by 20, for ſhillings; the ſhillings by 12, taking in 3*d.* for pence; and the pence by 4, for the anſwer in farthings. Remember to write the words *ſhillings*, *pence*, and *farthings*, oppoſite to their reſpective lines.

20 and 23. Divide ſucceſſively by 4, 12, and 20: the firſt remainder will be farthings; the ſecond, pence; and the third, ſhillings.

21. Multiply the pounds by 20, and take in 12*s*; the ſhillings by 12, and take in 4*d*; and, laſtly, the pence by 4, and take in 1 farthing. Write the names of the denominations oppoſite to their reſpective lines.

P. 23. The rule which is given at the beginning of Reduction, ſerves generally for troy-weight, and every other weight and meaſure; namely, to re-

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2. Here alſo a greater name, ſhillings, is to be reduced to a leſſer name, pence; therefore multiply by the number of pence in a ſhilling.

3. In this example, ſhillings are to be brought to pounds—a leſſer name to a greater; therefore divide by 20.

5. Divide by 12, becauſe 12 pence make 1 ſhilling; the quotient will be ſhillings, and the remainder pence. Write *s.* under the former, and *d.* under the latter.

8. Multiply 73, the number of pounds, by 20, and add 7 to the unit's figure of the product.

13. Multiply 47 by 20, and add 3 to the firſt, and 1 to the ſecond figure of the product.

14. Multiply the given number of pounds by 20, and the product will be ſhillings; which multiply by 12, and the laſt product will be the number of pence in 37 pounds.

15. Multiply 8 by 20, and take in 15, for ſhillings; multiply the ſhillings by 12, and take in 6, for the anſwer in pence. Write the word *ſhillings* oppoſite to the former, and *pence* oppoſite to the anſwer.

17. Divide the given number of pence by 12, and the quotient will be ſhillings; divide the ſhillings by 20, and the reſult will be pounds. The firſt remainder is pence, and the ſecond remainder, ſhillings. Annex the remainders to the anſwer, in this manner, 7*l.* 4*s.* 3*d.*

19. Multiply the pounds by 20, for ſhillings; the ſhillings by 12, taking in 3*d.* for pence; and the pence by 4, for the anſwer in farthings. Remember to write the words *ſhillings*, *pence*, and *farthings*, oppoſite to their reſpective lines.

20 and 23. Divide ſucceſſively by 4, 12, and 20: the firſt remainder will be farthings; the ſecond, pence; and the third, ſhillings.

21. Multiply the pounds by 20, and take in 12*s*; the ſhillings by 12, and take in 4*d*; and, laſtly, the pence by 4, and take in 1 farthing. Write the names of the denominations oppoſite to their reſpective lines.

P. 23. The rule which is given at the beginning of Reduction, ſerves generally for troy-weight, and every other weight and meaſure; namely, to reduce a greater name to a leſſer, multiply—and to bring a leſſer denomination to a greater, divide—and, in each caſe, by the number of the leſſer which make one of the greater.

25. Here a greater denomination is to be reduced to a leſſer; and as 12 ounces make 1 pound, multiply the given number by 12, and the product will be the anſwer in ounces.

26. Here, as in the preceding example, a greater name is to be reduced to a leſſer, and 24 of the leſſer make one of the greater: therefore multiply the number of penny-weights by 6 and 4, the component parts of 24, and the laſt line will be the anſwer in grains.

28. Reduce, as before, the given pounds to ounces, and multiply the ounces by 20, for the anſwer in penny-weights.

30. Multiply 141, the given number of pounds, by 12, for ounces, and the ounces by 20, taking in 11 dwts. for the anſwer in penny-weights. Write *ounces* oppoſite to the firſt, and *penny-weights* oppoſite to the ſecond product.

34. Multiply the pounds by 12, and take in 11 ounces; multiply the ounces by 20, for penny-weights; laſtly, multiply the penny-weights by 24, and take in 16 grains, for the anſwer in grains.

35. Here a leſſer denomination s to be brought to a greater; therefore divide firſt by 20, for ounces, and then by 12, for pounds; the firſt remainder will be penny-weights; the next remainder, ounces; and the laſt quotient, pounds.

36. Divide ſucceſſively by 24, 20, and 12. The firſt quotient is found by ſhort diviſion, in two lines. The laſt quotient will be the anſwer in pounds, and each remainder is of the ſame name as the dividend to which it belongs. This rule relative to the remainders is univerſal; and if the change of denomination in the ſeveral quotients be properly attended to by the pupil, he will never be

at a loſs to aſcertain the true name of each remainder.

P. 24. 37. *Cwt.* denotes hundreds; which is a greater denomination than that to which they are to be reduced, namely, quarters; therefore multiply by 4, the number of quarters which make 1 *cwt.*

38. Here a leſſer denomination is to be brought to a greater; and the component parts of the diviſor (16) are 4 and 4.

39. The number of pounds in 1 quarter are 28, of which the component parts are 7 and 4.

40. In this example, a leſſer denomination is to be brought to a greater; therefore divide the given number of hundreds by 20: the quotient will be tons, and the remainder (which will conſiſt of two figures) is of the ſame-name as the dividend.

41. Multiply 28, the given number of hundreds, by 4, taking in 1 quarter, for quarters; multiply the quarters by the component parts of 28, for the anſwer in pounds. As the laſt line is pounds, the 6*lb.* given in the queſtion, muſt be taken in there, and not at the middle line, whoſe denomination is neither quarters nor pounds.

46. Divide 9127 by 16, and the quotient will be ounces; which divide by 24, and the reſult will be great pounds. The component parts of 16 are 4 and 4, and thoſe of 24, 4 and 6.

47. Reduce the given pounds to quarters, the quarters to hundreds, and the hundreds to tons. As the denominations *increaſe* in value, the queſtion is performed by diviſion; and, *vice verſa*, when the names *decreaſe*, as in the next example, from hundreds to quarters, and from quarters to pounds, the queſtion is done by multiplication.

P. 25. 49. Anſwer, 10368 drams.

52. Divide the given number of drams by 8, and the quotient will be the anſwer in ounces.

The remainder is of the ſame denomination as the given quantity.

54. Reduce 32*lb.* to ounces, and take in 10 ounces; reduce the ounces to drams, and take in 3 drams; reduce the drams to ſcruples, and take in 1 ſcruple; laſtly, reduce the ſcruples to grains, and take in 14 grains. Write the names of the denominations oppoſite to their reſpective lines.

P. 26. 59. Multiply the given number of yards by 4, for quarters; multiply the quarters by 4, and the product will be the anſwer in nails.

66. Firſt, bring the nails to quarters, and then reduce the quarters to Flemiſh ells. The diviſors are, conſequently, 4 and 3.

P. 27. 71. Multiply the given number of poles by 11, for half yards; which divide by 2, and the quotient will be the anſwer in yards.

72. Reduce the given number of yards to half yards; which divide by 11, and the quotient will be the anſwer in poles.

77. Multiply the given number of miles by 1760, and, at the firſt line of the multiplication, take in 246 yards; and the product will be the anſwer in yards.

78. Divide the given number of yards by 1760, and the quotient will be the anſwer in miles. The remainder is of the ſame denomination as the dividend.

80. Here a leſſer denomination is to be brought to a greater; therefore, divide the given number of poles by 40. The diviſion is performed in one line, by cutting off the cipher in the diviſor, and the laſt figure of the dividend, as in the ſecond caſe of diviſion of integers.

P. 28. Multiply as follows:

15 *ac.* 2 *r.* 38 *p.*
4
roods.
40
poles.

83. Divide ſucceſſively by 40, for roods, and 4, for acres.

87. Here a greater denomination is to be reduced to a leſſer, and of the multiplier (63) the component parts are 9 and 7.

P. 29. 93. Divide the given number of gallons by the component parts of 63, and the quotient will be hogſheads; which divide by 4, for the anſwer in tuns.

95. Divide the given number of pints by 8, for gallons, and the gallons by the component parts of 84, for the anſwer in puncheons.

97. Multiply the given number of puncheons by the component parts of 84, and take in 71 gallons, for gallons; which multiply by 4, and the product will be the anſwer in quarts.

98. Reduce the tuns to hogſheads, the hogſheads to gallons, and the gallons to quarts. Write the names of the denominations oppoſite to their reſpective products.

P. 30. 99. The anſwers are 68 firkins, and 544 gallons.

101. Multiply the given number of barrels by 4, for firkins; the firkins by 9 (becauſe 9 gallons make 1 firkin of *beer)*, for gallons; and the gallons by 8, for the anſwer in pints.

105. Multiply the given number of hogſheads by the component parts of 48, taking in 32 gallons,

for gallons; which multiply by 4, for quarts; and the quarts by 2, for the anſwer in pints.

108. Reduce the given pints to gallons, the gallons to firkins (*beer* meaſure), and the firkins to barrels. The work will ſtand thus:

8 | 9272 pints of beer.
9 | gallons.
4 | firkins.
  | barrels.

109. The pints given in the queſtion muſt be brought to gallons; and, then, the gallons being divided by the component parts of 48, will give the anſwer in hogſheads.

P. 31. 114. Reduce the given number of quarts to gallons, the gallons to pecks, and, laſtly, the pecks to buſhels.

116. Multiply the given number of chaldrons by the component parts of 36, taking 34 buſhels into the laſt multiplication; and the product will be the anſwer in buſhels.

118. Here a leſſer denomination is to be reduced to a greater; the queſtion is therefore anſwered by diviſion. The diviſors are 8, for quarters, and 10, for laſts.

120. In this example, a greater denomination is to be reduced to a leſſer, and the multipliers are 2, 4, 2, and 4. The names of the products will be buſhels, pecks, gallons, and quarts.

P. 32. 123. Multiply 24 by 11, and the product will be hours; which multiply by 60, and the reſult will be the anſwer in minutes.

124. Multiply 672, the number of hours in 1 month, by the given number of months, and take in 17 hours; and the ſum will be the anſwer in hours.

125. Multiply 28, the days in one month, by the given number of months, taking in 3 days, for days; multiply the reſult by 24, for hours; multiply the hours by 60, and take in 16 minutes; and the reſult will be the anſwer in minutes.

126. Divide ſucceſſively by 60, for minutes; by 60, again, for hours; and by the component parts of 24, for the anſwer in days.

127. Divide firſt by the number of hours in 1 day, and then by the number of days in 1 week.

129. Reduce the given number of minutes to hours, the hours to days, and, laſtly, the days to weeks.

130. In other words, reduce 365 days, 5 hours, 48 minutes, 57 ſeconds, and 39 thirds, to thirds.

P. 33. The marks which occur here are (°) degrees, (′) minutes, (″) ſeconds, and (‴) thirds.

135. Multiply the thirds in one ſign (found in the preceding example) by 12, the number of ſigns in a great circle, and the product will be the anſwer in thirds.

136. Find how many ſigns are contained in the given number of ſeconds.

P. 46. 8. The blank ſpace in this queſtion may be filled up with the year in which the pupil was born.

10. In a lunar eclipſe, the ſun and moon are on oppoſite ſides of the earth; and the diſtance between them is evidently equal to the ſum of their reſpective diſtances from the earth.

On the contrary, in a ſolar eclipſe, when their poſition is directly the reverſe, their diſtance is equal to the difference of their reſpective diſtances from the earth.

P. 47. 14. For the names of the months, and the number of days in each month, *vide* above, p. 32. The ſame may alſo be found in the Calendar prefixed to the Book of Common Prayer.

15. Biſſextile, or Leap-year, in which February has 29 days, is found by dividing the laſt two figures of the given year by 4. If nothing remains, it is leap-year; and when the remainder is 1, 2, or 3, it is ſo many years after leap-year. Thus for the year 1788, divide 88, the laſt two figures of the year, by 4, and, as nothing remains, it is leap-year.

P. 51. 41. In the country, $8\frac{1}{2}$ gallons, or 17 half gallons, make 1 firkin.

42. The longitude of Conſtantinople is 28° 56′ E. and that of Savannah, 80° 20′ W. and their difference of longitude is found by adding both longitudes together.

P. 61. 20. The queſtion alluded to is No. 10, p. 46.

P. 62. 34. This queſtion is ſimilar to Ex. 80, compound ſubtraction, p. 56; and the given ſums muſt be placed in exactly the ſame order as in that example.

P. 63. 37. The only difficulty in this queſtion is the expreſſing in figures the ſon's fortune, *viz.* eleven thouſand, eleven hundred, and eleven pounds. But eleven hundred pounds are equal to one thouſand and one hundred pounds: it is evident, then, that the ſon's fortune, expreſſed in proper terms, is twelve thouſand, one hundred and eleven pounds.

38. From the ſum of the factor's receipts ſubtract the ſum of his diſburſements, and the remainder will be the anſwer to the queſtion.

43. Add the quantities, which were ſold, together, for a ſubtrahend, and the reſt of the quantities, mentioned in the queſtion, add together, for a minuend; then the difference will be the quantity remaining on hand.

P. 65. 52, 53, and 54. To find the component parts in theſe examples, divide the given multiplier by any number which will leave no remainder; then if the quotient be a compoſite number, its component parts, and the number divided by, will be the three component numbers required. Thus for 432:

9 | 432
—
48 the quotient, of which the component parts are 8 and 6. Therefore 9, 8, and 6, are the multipliers, or diviſors, for 432.

P. 66. 104. Multiply the given ſum by 360, and to the product add 5 times the firſt line.

P. 69. 16. The continual product of 1, 2, 3, 4, 5, 6, 7, and 8, will give the number of changes required.

19. Multiply 217 by 217, and the product will be the ſquare of 217.

20. Multiply the ſquare of 8013 by 8013, and the product will be the cube of the given number.

22. At firſt ſight, theſe numbers may not ſeem unequal: the latter number is not twice two-and-twenty, (for that would be equal to twice twenty-two,) but twenty more than twice two.

24. Multiply the number of faces upon each die together, and the product will be the number of ways required.

P. 70. 31. Multiply the price of 1 yard by the given number of yards, and the product will be the anſwer.

43. A pound ſterling is 20 ſhillings of Engliſh money.

P. 72. 88. Multiply 11¼*d.* by 4, and the product will be the price of 1 gallon; then multiply the price of 1 gallon by the number of gallons in 1 hogſhead, and the product will be the anſwer.

P. 73. 101. Multiply the value of 1 acre by 813$\frac{1}{4}$, and the product will be the anſwer.

102. 5*cwt.* that is, 5 times 112*lb.* are equal to 560*lb*; therefore multiply the price of 1*lb*: by 560, and the product will be the anſwer.

103. Multiply 2$\frac{3}{4}$*d.* by 112, and the product will be the price of 1*cwt*; then multiply the price of 1*cwt.* by the given number of hundreds, (11,) and the product will be the anſwer.

104. Multiply the expence of 1 day by 365, to the product add 30*l.* and the ſum will be the yearly income required.

P. 81. 35. From 200*l.* ſubtract 73*l.* and divide the remainder by 2: the quotient will be the leſſer ſhare, to which add 73*l.* and the ſum will be the greater ſhare.

36. Add all the ſums, given in the queſtion, together; and, as each perſon's debt is twice given, half that ſum will be the amount of all their debts. The debt of each perſon ſeparately may then be found by ſubtraction.

P. 83. 68. Divide 10000 pounds by the number of days in a common year (rejecting the 6 hours), and the quotient will be the anſwer.

71. As 1 man is to have as much as 2 women, 6 men are equivalent to 12 women; to which add 9 women, and the ſum is 21 women. Each woman is therefore to have a twenty-firſt part of the given money, and each man, twice as much.

72. This queſtion is anſwered in nearly the ſame manner as the preceding. According to the given proportions, 20 men are to receive as much as 540 boys, and 30 women as much as 270 boys; to theſe numbers add 40 boys, (given in the queſtion,) and the ſum will be 850 boys. Divide therefore the given money by 850, and the quotient will be the ſhare of 1 boy; which multiply by 9, for 1 woman's ſhare, and the ſhare of 1 woman multiplied by 3 will give 1 man's ſhare.

P. 85. 47. Reduce the given ſum 194*l.* 10*s.* to ſix-pences, and divide by the number of ſix-pences in a half-guinea. The quotient will be half-guineas; and the remainder, if any, is of the ſame denomination as the dividend, *viz.* ſix-pences.

In nearly the ſame manner may be anſwered the next ſix queſtions in reduction.

54. In this queſtion, the diviſor is the ſum of 1 crown, 1 half-crown, and 1 ſhilling, reduced to ſix-pences, and the dividend, 48*l.* 9*s.* 0*d.* reduced to the ſame denomination. The anſwer is 114 of each.

Proof. Find the ſum of 114 crowns, 114 half-crowns, and 114 ſhillings; and it will be equal to the ſum given in the queſtion.

The following queſtions in reduction, *viz.* 55, 56, 57, 76, 94, and 126, are ſimilar to queſtion 54, and may be anſwered and proved in nearly the ſame manner.

P. 87. 74. Divide the weight of the given quantity, (firſt reduced to penny-weights,) by the weight of a bar, (reduced alſo to penny-weights,) and the quotient will be the number of bars required.

78. Multiply the given number of hundreds by 112, and take in 14*lb.* and the ſum will be pounds, which reduce to ounces and drams.

P. 88. 97. Apothecaries weight.

110. Multiply the number of inches in 1 mile by 167, and the product will be the anſwer.

111. Divide 2¼ miles, (reduced to inches,) by 2*f.* 8*in.* (reduced alſo to inches,) and the quotient will be the anſwer.

112. For a diviſor, reduce 5*yds.* 1*f.* 7*in.* to inches, and, for a dividend, reduce 386 miles to the ſame denomination. The quotient will be the number of revolutions made by a wheel of that circumference between any two places, whoſe diſtance is 386 miles.

P. 89. 114. One degree is equal to 69½ ſtatute miles, which is half a mile leſs than 70; therefore multiply the given number of degrees by 70, from the product ſubtract half the multiplicand, and the remainder will be the anſwer in ſtatute miles.

116. Multiply 190080, (the number of barley-corns in a mile,) by 69½, and the product multiplied by 360 will give the anſwer.

119. From the content of the field ſubtract A.'s ſhare, and reduce the remainder to yards, by ſquare or land meaſure.

125. Multiply the number of pints in 1 tun, (*vide* Table, p. 28,) by 13, and the product will be the anſwer.

127. To 210 hogſheads add 300 pipes, and 180 barrels, (each being previouſly reduced to hogſheads,) and reduce the ſum to gallons. Multiply the gallons by 8¼, and the product will be pounds; which reduce, by diviſion, to quarters, hundreds, and tuns.

P. 90. 136. Reduce the given number of firkins (*ale* meaſure) to gallons, and divide by as many gallons as make 1 hogſhead of *beer*.

141. Multiply the given number of ſacks by the number of pecks in each ſack, and reduce the product to buſhels, and chaldrons.

144. A century is 100 years.

P. 92. 15. Here the two terms of ſuppoſition are 1*l.* 14*s.* 7*d.*, and 1 quarter of corn; and the name of the required term is money.

P. 93. 35. 12*doz.* make 1 groſs.

38. The two terms of ſuppoſition are 671*l.* 5*s.* and 123*l.* 1*s.* 3*d.* of which 123*l.* 1*s.* 3*d.* is of the ſame name as the required term, *viz.* the tax on 1*l.*

39. The two terms of ſuppoſition are 3 eighths and 388*l.* 17*s.* 6*d.* and the term of demand, the whole ſhip, or 8 eighths. The reduction of the

ſecond term in this queſtion may be omitted, multiplying by the third term, as in compound multiplication, and dividing the product by the firſt term, as in compound diviſion.

P. 109. 3. Reduce the given groſs weight into pounds, from which ſubtract 65 pounds, the tare, and the remainder will be the neat weight in pounds: then find their amount, at 9½*d. per lb.* by practice.

II. *A Collection of Arithmetical Queſtions, intended for the Examination of young Beginners.*

ARITHMETIC.

Q. What is arithmetic?

NUMERATION.

Q. What is numeration?—Repeat the names of the places of the firſt twelve figures, beginning with that of unit.

NOTATION.

Q. What is notation?

ADDITION.

Q. What is addition?

Q. How do you prove the anſwers to be right?

SUBTRACTION.

Q. What is ſubtraction?

Q. How is the proof performed?

MUL-

MULTIPLICATION.

Q. What is multiplication ?

Q. How do you multiply by a number not exceeding 12 ?

Q. How do you multiply by a number having ciphers to the right hand, the ſignificant figures not exceeding 12 ?

Q. How do you multiply by a number which is greater than 12, and which is the product of two numbers in the multiplication table ?

Q. How do you multiply by a number conſiſting of ſeveral figures ?

Q. How are queſtions in this rule generally proved ?

DIVISION.

Q. What is diviſion ?

Q. How many parts are there in diviſion ?—Name them.

Q. How do you divide by a number not greater than 12 ?

Q. In what manner is the laſt remainder to be ſet down ?

Q. How do you divide by a number having ciphers to the right hand, the ſignificant figures not exceeding 12 ?

Q. How do you divide by a number greater than 12, and the product of two numbers in the multiplication table ?

Q. When there are two diviſors, it frequently happens, that there are alſo two remainders ; how, in this caſe, is the whole remainder found ?

Q. What queſtions are worked by long-diviſion ?

Q. How is long-diviſion performed ?

Q. How do you divide by a mixed number ?

Q. How are queſtions in diviſion proved ?

REDUCTION.

Q. What is reduction?

Q. How do you reduce greater denominations to leſſer?

Q. How are ſmall denominations brought to greater?—Repeat the following tables.

Money.

— ſhillings make 1 pound, — pence make 1 ſhilling, — farthings make 1 penny.

Troy Weight.

— ounces make 1 pound, — penny-weights make 1 ounce, — grains make 1 penny-weight.

Avoirdupois Weight.

— hundreds make 1 ton, — quarters make 1 hundred, — pounds make 1 quarter, — ounces make 1 pound, — drams make 1 ounce.

Apothecaries Weight.

— ounces make 1 pound, — drams make 1 ounce, — ſcruples make 1 dram, — grains make 1 ſcruple.

Cloth Meaſure.

— quarters make 1 French ell, — quarters make 1 Engliſh ell, — quarters make 1 yard, — quarters make 1 Flemiſh ell, — nails make 1 quarter.

Long Meaſure.

— geographical, or — ſtatute miles make 1 degree, — miles make 1 league, — furlongs, or — yards, make 1 mile, — poles make 1 furlong, — yards make 1 pole, — feet make 1 fathom, —

feet make 1 yard, — inches make 1 foot, — barley-corns make 1 inch.

Square or Land Meaſure.

— roods make 1 acre, — ſquare poles make 1 rood.

Wine Meaſure.

— pipes make 1 tun, — hogſheads make 1 pipe, — gallons make 1 puncheon, — gallons make 1 hogſhead, — gallons make 1 tierce, — gallons make 1 barrel, — gallons make 1 rundlet, — gallons make 1 anker, — quarts, or — pints, make 1 gallon, — pints make 1 quart.

Ale and Beer Meaſure.

— gallons make 1 hogſhead of beer, — gallons make 1 hogſhead of ale, — firkins make one barrel of ale or beer, — firkins make 1 kilderkin, — gallons make 1 firkin of beer, — gallons make 1 firkin of ale, — quarts, or — pints, make 1 gallon, — pints make 1 quart.

In the country, — gallons make 1 firkin of ale or beer.

Wincheſter or Dry Meaſure.

— ways, or — quarters, make 1 laſt, — quarters make 1 way, — buſhels make 1 chaldron, — buſhels make 1 ſtrike, — pecks make 1 buſhel, — gallons make 1 peck, — quarts, or — pints, make 1 gallon, — pints make 1 quart.

Time.

— days — hours make 1 Julian or common year, — weeks make 1 month, — days make 1 week, — hours make 1 day, — minutes make 1 hour, — ſeconds make 1 minute, — thirds make 1 ſecond.

Motion.

— ſigns, or — degrees, make a great circle, — degrees make 1 ſign, — degrees make 1 hour, — minutes make 1 degree, — ſeconds make 1 minute, — thirds make 1 ſecond.

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B L

On Cautiousness

Boys, we ought

Always to ~~be~~ attend to what
we are doing or perhaps we
may get into a prison or [illegible]